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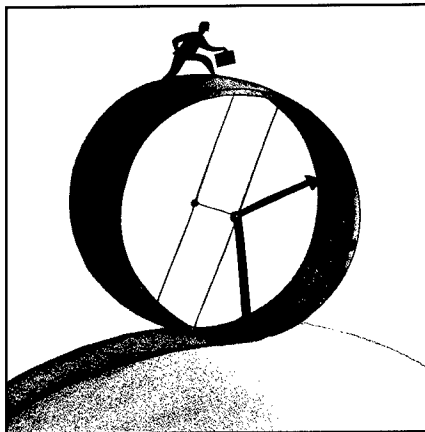
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Army Lt. Gen. Paul Kern Leading Sweeping Change in AAC Education and Training System

Program Manager Interview

Army Lt. Gen. Paul Kern is moving Army Education and Training from Industrial-Age processes and metrics to the power of the Information Age.



A Total Systems Life Cycle View on Reducing Cycle Time

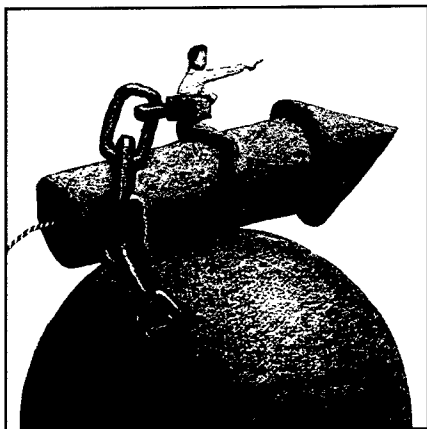
Lt. Col. Brian Brodfuehrer, U.S. Air Force
DSMC Systems Engineering Management instructor looks at cycle time reductions from a *total systems life cycle* perspective.



Operational Evaluation of Electromagnetic Environmental Effects (E3)

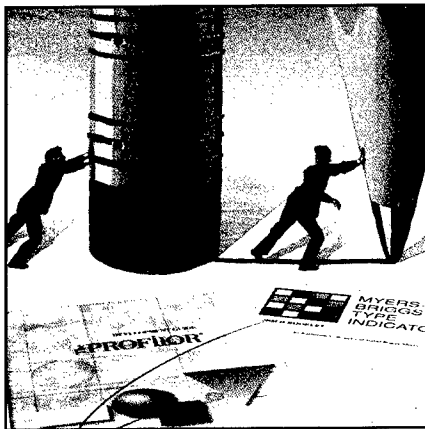
Mario Lucchese • Dr. C. Leslie Golliday Jr. •
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New DOT&E policy calls for more systematic assessment of E3.



Invest Today or Stop Flying Tomorrow

Capt. Kenneth B. Bowling, U.S. Air Force
A critique on outsourcing depot repair.



Taking Theory to Practice

Maj. Todd Johnston, U.S. Air Force • Dr. Beryl Harman
DSMC student teams with APMC researcher to assess self-development needs of students in a multifunctional workplace.



Innovations in Logistics Modernization

Victor J. Ferlise
Wholesale Logistics Modernization Program (WLMP) will overhaul Army's logistics system.

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Gansler Issues New Performance-Based Services Acquisition (PBSA) Guidance.....	10
NATO Evaluating ALIS - Acquisition Logistics Information System Technology Demonstrator	11
Foreign Military Sales Program	20
APMC 00-1 Students "Bowled Over" at Richmond Facility	28
Excerpts from Congressional Testimony — Dr. Jacques S. Gansler & Dr. Delores M. Etter	30
Section 912c Working Group Completes Final Report.....	34
Selected Acquisition Reports.....	36
Third International Acquisition/Procurement Seminar — Pacific	41
From DSMC Protégé to MDW Award-Winning Photojournalist	47
Program Forges Next Generation of Civilian DoD Leaders.....	48
Call for Authors (PM).....	49
Federal Acquisition Regulation Plain Language Initiative	54
Call for Authors and Referees (ARQ)	61
Inside DSMC.....	65
Did You Know PM Magazine is Now Online?	65
Are You New to DoD Procurement?	65
Defense Awards Given for Competitive Research.....	72
DoD Adapts Off-the-Shelf Technology.....	73
2000 Acquisition Goals	74
DoD Establishes Defense Contract Management Agency.....	79
Twelfth Annual International Acquisition/Procurement Seminar — Atlantic (IAPS-A)	80
Train with DoD Counterparts.....	81
1999 Testers of the Year	87
Canada's Roy Brander on the Test, Evaluation and Acquisition of the Titanic	89
International Students Add Cultural Awareness, Diversity to APMC 00-2	89
DAU Beyond 2000 Conference.....	90
Surfing the Net.....	91
Message from Keith Charles.....	Inside Back Cover



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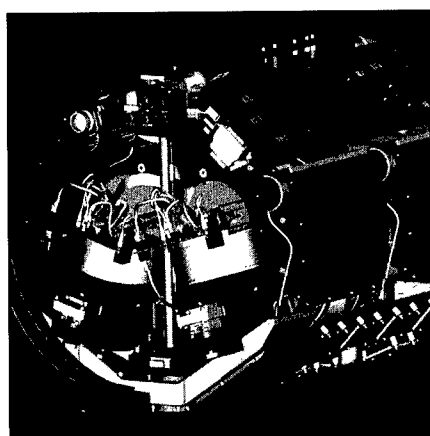
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ONR Spearheads Successful Mine Countermeasures Program

R.S. Jacobson • John McLean • Stephen G. Hunt • Mary Cameron Hulgan

Four IPT members present experiences, lessons learned from a successful mine countermeasures program.



International Congress and Exhibition On Defense Test, Evaluation and Acquisition

Norene L. Blanch

Vancouver Congress focuses on "The Global Marketplace."

Army Lt. Gen. Paul Kern Leading Sweeping Change in AAC Education and Training System

by Joann H. Langston / Editor, The Acquisition Executive
 Director of Information Systems

SMC is proud to claim Army Lt. Gen. Paul Kern as a 1982 alumnus of its former 20-week Program Management Course (now renamed the 14-week Advanced Program Management Course). In fact, to our knowledge Kern is the College's first graduate to hold the title of Director, Army Acquisition Corps, the Army's highest military acquisition executive. But that isn't the only hat he wears. Kern is the Military Deputy to the Assistant Secretary of the Army (Acquisition, Logistics and Technology) Paul J. Hoeper, advising Hoeper in his responsibilities as Army Acquisition Executive, Senior Procurement Executive, Science Advisor to the Secretary, and senior research and development official for the Department of the Army.

An Orange, N.J., native, Kern is a 1967 West Point graduate with extensive command and acquisition experience. Downsizing; rightsizing; streamlining; continuous learning; distance learning; cross-functional training; Simulation and Modeling for Acquisition, Requirements, and Training (SMART) — these are but a few of the issues in which he and his talented workforce have been deeply immersed since his appointment as Director and Military Deputy in July 1997.

As part of the Army headquarters team, he has helped usher in sweeping change

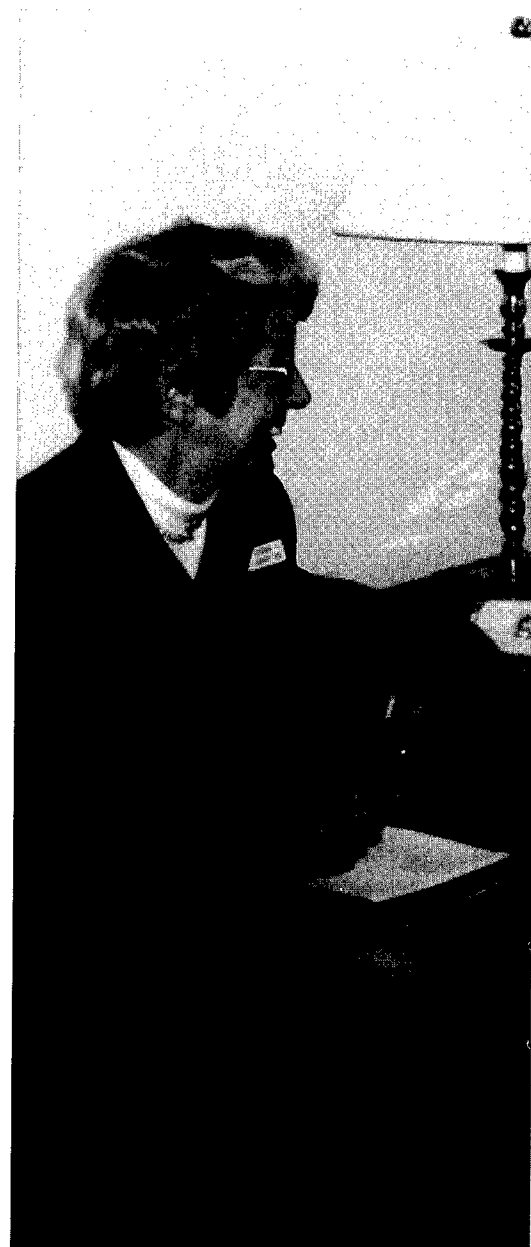
in the Army's acquisition practices, processes, and business procedures.

The Army is winning its war against an acquisition system that 10 years ago was characterized by outdated processes and numerous inefficiencies. They are doing so with managers like Kern, who are focusing on the problem at its most critical juncture: *people and training*. In this article, Kern talks about many of the most pressing civilian and military issues facing the career acquisition workforce.

What adjustments have you made in streamlining the membership of the Army Acquisition Corps [AAC]? What are your specific plans in guiding this membership in 2000 and beyond?

The Army's primary adjustment has been a broadening of the Acquisition Corps member's skill base. No longer can we rely on a massive corps of individuals specializing on one aspect of the acquisition business. We are attempting to create a group of multifunctional experts in order to more effectively deal with the reduced size of the corps. To that end, we are working within the personnel system to provide training and rotational job opportunities to give individuals a chance to broaden their skills base.

As a result of the requirement to streamline, the Acquisition Career Management Office has re-looked at the definition of the Acquisition Workforce [AWF] itself. Over the past 10 years, the Army Acqui-



Joann H. Langston interviewed Kern on behalf of the DSMC Press. Langston is the Army Chair, DSMC Executive Institute. She holds a B.A. from the College of New Rochelle and a J.D. from the University of Maryland.

sition Corps has evolved into the professional body of men and women now serving in it, and this is another step in that evolution.

The Army invested considerable effort into establishing an acquisition workforce management policy that allows it to deal effectively with the changes mandated by streamlining. There has been no decrease in mission. We are faced with a retirement dilemma in the near future, estimating that by 2003 over 50


percent of the Army Acquisition Workforce will be eligible for retirement. Without a responsive, flexible management plan, the Army could potentially lose a large portion of its core acquisition knowledge base and not have adequate backfill. This comes at a time when we are challenged to implement the Chief of Staff of the Army's vision for *Army Transformation in the 21st Century*—a vision whose execution will be highly dependent upon the performance of the Army Acquisition Corps.

In recognition of this problem, the Army Acquisition Corps is actively recruiting members earlier in their civilian and military careers. In our recruiting efforts, we emphasize our tremendous educational and training opportunities as well as challenging and rewarding job experience. We have established a culture that recognizes and rewards performance, excellence, and commitment—an environment in which the most capable are challenged with the toughest jobs. In 2000 and beyond, our goal is to maintain our world-class workforce to the high standards that are expected.

What plans (hopes, dreams, expectations) do you have for Army acquisition going into the new millennium? Do you have any specific restructuring or reengineering plans? Will you be focusing more on newer technology and training?

One of the Acquisition Corps' major roles is to ensure that the application of resources in developing concepts into weapons systems supports warfighters effectively across the full spectrum of future operations. The Acquisition Corps has been challenged to examine fresh new ways of doing business in order to reduce cycle times, leverage commercial technologies, and reduce acquisition costs. One of the Army's main goals in molding the acquisition workforce to accomplish these tasks is to convert it from a force accustomed to acquiring systems in an Industrial Age with Industrial-Age processes and metrics, to one that takes advantage of the power and capabilities of the Information Age.

Simulation and Modeling for Acquisition, Requirements, and Training [SMART] will be a major application of computer technology for AAC members. Streamlining the future design process necessitates exploitation of available advanced computer-based design tools, collaborative environments, and shared data structures. Web-based data sharing will ensure that our AAC members have access to the tools and data key, streamlining the acquisition process. The



Joann H. Langston, Army Chair, DSMC Executive Institute, interviews Army Lt. Gen. Paul J. Kern, Military Deputy to the ASA (AL&T) and Director, Army Acquisition Corps. Kern was visiting the DSMC main campus, Fort Belvoir, Va., as an invited distinguished guest lecturer.

LT GEN. PAUL J. KERN, U.S. ARMY

Military Deputy to The Assistant Secretary of the Army for Acquisition, Logistics and Technology
Director, Army Acquisition Corps



Lieutenant General Paul J. Kern, as Military Deputy to the Assistant Secretary of the Army for Acquisition, Logistics and Technology, is the senior military advisor to the Army Acquisition Executive and the Army Chief of Staff on all research, development, and acquisition programs and related issues. He supervises the Program Executive Officer system, and serves as the Director, Army Acquisition Corps.

Kern, a native of New Jersey, was commissioned in 1967 following graduation from the United States Military Academy. In 1973 he earned master's degrees in Mechanical and Civil Engineering from the University of Michigan. His military education includes the Armor Basic Course, Infantry Officer Advanced Course, United States Army Command and General Staff College, Defense Systems Management College, and a Harvard University Senior Service College Fellowship.

Prior to assuming duties as the Military Deputy, Kern served as the Commander, 4th Infantry Division (Mechanized), the Army's Experimental Force. His career includes service as the Senior Military Assistant to the Secretary of Defense and Senior Military Assistant, Defense Research and Engineering for Test and Evaluation, Office of the Secretary of Defense, Washington, D.C.; and Director Requirements (Support Systems), Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C.

Kern also served as Team Chief, Light Combat Vehicle Team, Office of the Deputy Chief of Staff for Research, Development and Acquisition, Washington, D.C.; and as the Program Branch Chief, Bradley Fighting Vehicle Systems, Warren, Mich. He taught weapon systems and automotive engineering at the United States Military Academy and was the Department's research officer.

Kern's career includes service as Commander, 5th Battalion, 32^d Armor, 24th Infantry Division, Fort Stewart, Ga.; Commander, 2^d Brigade 24th Infantry Division at Fort Stewart and Southwest Asia during Desert Storm; and Assistant Division Commander of the 24th Infantry Division at Fort Stewart.

He also served two tours in Vietnam with the 11th Armored Cavalry Regiment as a platoon leader and troop commander; and as a battalion operations officer with the 3^d Armored Division in Germany.

Kern's awards and decorations include the Defense Distinguished Service Medal, the Army Distinguished Service Medal, Silver Star, Defense Superior Service Medal, two awards of the Legion of Merit, two awards of the Bronze Star Medal with "V" Device, three awards of the Bronze Star Medal, three awards of the Purple Heart, five awards of the Meritorious Service Medal, the Army Commendation Medal, Parachutist Badge, Ranger Tab, Office of the Secretary of Defense Identification Badge, and the Army Staff Identification Badge.

product development and fielding process will feel the impact. SMART will support conceptual analyses, analysis of alternative designs, user interface evaluations, and even system test and evaluation. Early performance assessments can be made through integrated simulation environments that leverage CAD [Computer Aided Design] products to assess both technical and functional (warfighting) performance of alternative designs. If we do this correctly, the user will be involved throughout the process in design trades, and training devices will be part of the system development. In the realm of training, the future acquisition workforce will need to employ the advanced training tools that will be available in order to maintain pace with technology and to hasten management skills development. Examples include advanced computer-based training, intelligent tutoring systems, distance learning, and Web-based instruction. I will be encouraging advanced degrees in engineering and science.



How are relationships among the AAC, suppliers, and customers?



The AAC and its industrial counterparts enjoy a very strong and, for the most part, positive relationship. Project teams consisting of government and industrial partners now vie for a common goal, to bring world-class equipment to our soldiers. The day of the "we-they" syndrome is gone; it is counterproductive to mission accomplishment and most parties realize that. However, the fiscally constrained environment the Army now faces has placed a lot of concern and some angst in industry. As a result, I would characterize the larger relationship as reasonable but in need of constant attention.



What acquisition reform initiatives do you plan to incorporate in training and education for AAC personnel, and is it going as fast as you'd like? Any foreseeable problems? What benefits do you hope to reap? What special problems, if any, are related to training your civil-

ian force (structure of civilian personnel system, etc.)?

A Best qualified, highly trained leaders are required to support the Chief of Staff of the Army's vision for *Army Transformation in the 21st Century*. These leaders will oversee the Army's acquisition, logistics, and technology programs so critically connected to the Chief's vision of a rapidly deployable force.

Our AWF members are challenged today as never before by the rapidly changing environment in which they must function. To accomplish the Chief's vision, the workforce must be current with reforms, adaptable, flexible, and willing to accept risk and exercise leadership. Consequently, we must provide the future acquisition workforce with skills to transition from a workforce of "doers" to one that manages the work of others — we must build *Leaders*.

In this vein, the workforce must consist of individuals who possess a wide range of leadership and management competencies that go well beyond functional expertise unique to a particular career field. The leaders of the future must understand the big picture and how the various aspects of not only their speciality, but that of other functional areas, fit inside the big picture. The Army Acquisition Corps vision is built around these needs.

The first objective of the AAC Vision — "a highly competent acquisition workforce responsive to current and future needs of the Army" — is met by obtaining "functional expertise." Our future leaders gain function-specific knowledge and skills by completing the required education, training, and experience needed for certification (Level III) in a given acquisition career field.

The second objective of the AAC Vision — "A clearly defined environment that supports and encourages career progression and leader development at all levels" — is met through "broadening experience." Our future leaders should obtain Level II certification in at least one



"We are faced with a retirement dilemma in the near future, estimating that by 2003 over 50 percent of the Army Acquisition Workforce will be eligible for retirement. Without a responsive, flexible management plan, the Army could potentially lose a large portion of its core acquisition knowledge base and not have adequate backfill."

additional acquisition career field. They would have to be willing to be more flexible, mobile, and successfully perform in a variety of positions and assignments of increased responsibility. This experience will build the functional and leadership competencies required for success in future key leadership positions.

As we continue to thrive in this changing environment, our future leaders must

advance to the level of "strategic leadership," which allows them to apply acquired leadership/functional competencies in their key leadership positions.

We have developed a process (Structure/Position Management) that incorporates competencies through position descriptions, which are driven by the organization structure in support of the acquisition mission. Using the competencies, one can assess their strengths and weaknesses and identify career-enhancing positions, which support their individual development goals and objectives. In essence, our workforce is as important as the mission it is trying to support.

We fully support the USD(AT&L) [Under Secretary of Defense, Acquisition, Technology and Logistics] Policy on Continuous Learning. The changing workplace is also changing the way people must learn and places increased expectations on employees to remain current by taking advantage of new ways of learning. In addition to the traditional classroom student/instructor approach, we have encouraged and implemented distance learning technologies. We also recognize the importance of experiential learning and its impact on helping people see the "big picture and their place in it."

In light of this, we have incorporated cross-functional training, developmental and on-the-job experiential assignments into our career development program. An excellent and highly successful example of this is our Competitive Development Group Program. This is a three-year developmental program that offers high-potential, board-selected civilian personnel expanded training, leadership, and other career development opportunities. It is designed to develop civilian leaders for the Army of the 21st century.

Branch qualifying positions will be formally designated this year and will be used by supervisors in the field to help select and develop our leaders. This will become part of the mentoring process to ensure the balance of technical and management positions are addressed for the promising leaders of the AAC.

Assuming acquisition reform is not one final ultimate goal, but rather a constantly evolving mission that changes with new missions and goals, how will you ensure further success? How will you continue to implement changes already made under acquisition reform? How does acquisition reform affect the AAC?

The implementation of acquisition reform initiatives has directly impacted the workforce. Acquisition reform opened the door to new ways of doing business and mandated migration of the workforce from one that approached acquisition from a lock-step, risk-averse templated process to one of innovation, flexibility, and measured risk. It required a fundamental change in the long-standing cultural underpinnings of the workforce. The reform initiatives mandate that those in the acquisition process change the fundamental way they do business. They must better understand the way commercial enterprises conduct business, how commercial technology development is managed, and then incorporate these business practices into their system acquisition programs as appropriate.

Over the past seven years, DoD and the Army have worked closely with Congress to develop a statutory and regulatory structure that brings common sense back to procurement. We have moved much closer to commercial practices. Instead of just looking at the lowest cost, we now emphasize "best value" contracts that take into account the quality of the performance expected based on the overall package offered and the contractor's past performance. We have made it *much* easier for the government to *purchase*, and *companies* to *sell*, commercial, off-the-shelf products that are suitable for government needs and have moved away from the idea that we must have custom products to meet our needs. We have made it possible for program officials to use purchase cards to make purchases under \$2,500 (so-called "micro-purchases"), thereby allowing our contracting experts to focus on providing business advice for our larger acquisi-

tion programs. These reforms allow agencies to structure their contracting operations in a way that makes sense and provides increased flexibility for contracting officials to make and implement good business decisions.

Despite the progress that has been made, there is still more to be done. First, we must ensure that we are fully using the increased flexibility and realizing the increased efficiency under the reforms now in place to deliver mission benefits. Second, we must continue to look ahead – staying alert to changing commercial practices and conditions and new technologies – to identify additional reforms with substantial potential benefits.

We are trying to ensure full implementation of key practices that will move us closer to the commercial model. We are making contractor performance a substantial factor in contract administration and source selection; encouraging contractors to innovate in deciding how to perform the work and tying payment to performance; making effective use of competition to obtain the best deals; and improving the planning and execution of capital asset acquisitions.

The Army is also seeking to take advantage of the opportunities that electronic commerce [EC] offers to improve acquisition. We are looking to EC applications with high returns in terms of significant process simplification, increased efficiency, and more effective buying strategies.

The Army is focused on implementing programs that allow the AAC to take full benefit of acquisition reform. Acquisition Corps' leadership must also be sensitive to the dynamic nature of the environment in which we operate. In today's fast-changing world, those who ignore the need to continue the quest to improve soon find that they are left behind. Commercial industry understands this, and companies continuously strive to improve their competitive position. Our citizens, having experienced the benefits of vigorous commercial market competition, similarly expect their government continuously to improve its

performance. Moreover, today's tight budgets require that government officials continuously seek to reduce costs just to maintain current levels of government effectiveness. Thus, at the same time that we vigorously pursue implementation of best practices we have already identified, we must continue to seek out additional ways to improve our strategies and processes.

What technological advances do you see being of the greatest importance (impact, value) to AAC?

Key technology advances will be those that enable SMART. Technologies that further Web-based collaborative environments, advanced CAD tools, object-oriented simulation, hyperlinked data structures that allow immediate access to relevant engineering data, visualizations, and reference documents will have the most utility to the acquisition workforce. Included here are the advances in training technology that will allow our workforce to understand and exploit the powerful tools available to them to expedite the acquisition process.

What are some of the problems facing the AAC regarding technology? With manpower? With funding? With resources?

One of the fundamental technological challenges facing our workforce is adapting to the changes brought about as the United States evolves from an Industrial-Age power to an Information-Age one. As we move from a paper- and iron-based society to one that is electron- and computer-based, one of our problems will be to ensure we have a computer-literate and simulation-literate workforce that can exploit the power inherent in the tools and methods available to them. We must ensure that they have the tools required and that they receive the necessary training to effectively employ them. In addition to this overarching concern there are other, more immediate concerns that AAC leadership must tackle.

ARMY MODERNIZATION

PROMOTION RATES

During recent promotion boards, the AAC achieved equal or higher rates of in-zone promotion of officers to brigadier general and major general but lower rates for promotion to lieutenant colonel and colonel. This was the second consecutive year that the AAC did not achieve parity for in-zone and below-zone promotions to lieutenant colonel, and below-zone promotions to colonel. Without recent troop assignments, Army acquisition majors are not being promoted at a rate equal to their counterparts in basic branches (i.e., Infantry, Armor, Field Artillery, etc.).

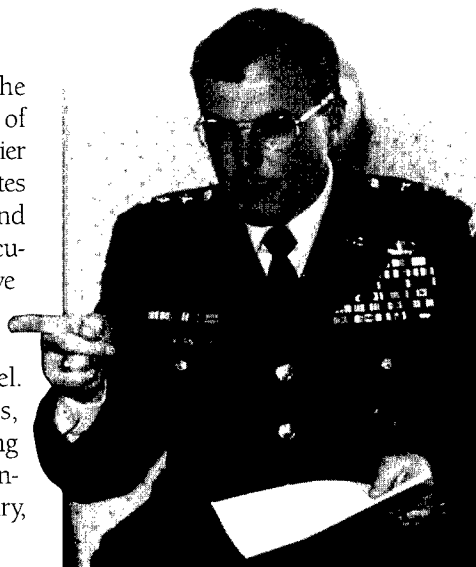
In order to mitigate this problem, the AAC is working with the personnel community to ensure that year group models appropriately consider the smaller follow-on year groups rather than focusing solely on current inventories when determining promotion requirements. In addition, the Army's Officer Personnel Management System XXI, planned for full implementation in 2001, will no longer require acquisition officers to compete for promotion against operations career field officers. The AAC remains confident of the quality of its acquisition corps officers and believes promotion rates will return to parity after a period of transition.

AAC OFFICER ACCESSIONS

The most unfortunate consequence of recent promotion board results has been the decrease in the number of officers applying for career field designation in acquisition. This is especially troubling in light of the pivotal role the AAC will play in achieving the Chief of Staff of the Army's vision for Army Modernization. Two initiatives will address low accessions: first, a recruiting campaign, and second, entry of the acquisition functional area into the career field designation process during an officer's fifth year of service.

Other specific areas of concern include:

- Promotion rates of computer science specialist.
- Underrepresentation of women in the AAC.



"As we move from a paper- and iron-based society to one that is electron- and computer-based, one of our problems will be to ensure we have a computer-literate and simulation-literate workforce that can exploit the power inherent in the tools and methods available to them."

- Keeping AAC members in touch with an Army in transformation.

CIVILIAN WORKFORCE

AGING CIVILIAN WORKFORCE

Federal, state, and local governments will face significant human resources challenges in the years ahead due to an aging workforce. The civilian component of the AAC is not immune from this situation. By 2003, over 50 percent of the AAW will be eligible to retire; the percentage increases to over 60 percent by 2005.

Providing opportunities for the civilian workforce to broaden the experience

base and changing the culture of the workforce to embrace this new career path remain problematic to some degree. Acquisition leadership must continue to work within the personnel system to find ways to provide these opportunities and balance the needs/concerns of the workforce.

There is no doubt that one of the AAC's major challenges as it moves into the 21st century will be adequate resources. In order to meet strategic requirements, Gen. Eric Shinseki [Army Chief of Staff] announced The Army Vision and comprehensive transformation in October 1999. The President's budget request provides the funds necessary to meet FY 2001 transformation requirements. It is a critical first step. However, a major challenge facing us as we move out on this bold venture is garnering and maintaining the support of OSD [Office of the Secretary of Defense] and Congress throughout the Transformation ... until we achieve the Objective Force in FY 2012.

The support of the Administration and Congress has allowed the Army to begin its transformation. The additional \$100.0 million provided by Congress this year (FY 00) to assist with our initial efforts is greatly appreciated. It provides the Army with important flexibility as we move forward with this critical endeavor. Over the past months, we have worked closely with the Office of the Secretary of Defense to resource transformation requirements in FY 2001.

The Army's modernization strategy will support implementation of the Army's vision by harnessing recent efforts to incorporate information technologies to help sustain decisive capabilities. Accelerating some programs will enhance responsiveness and make our light forces more lethal. Restructuring and divesting selected programs will tailor acquired capabilities to meet the most critical Army requirements while freeing up some of the resources needed for the transformation. Efforts to harness new S&T [science and technology] will elicit advances that support the desired characteristics of the Objective Force. In each

of these areas, the support of the Administration and Congress is essential to ensure Army modernization keeps pace with the demands of the international security environment and the National Security Strategy.

Beyond the battles over resources and money, the military is always struggling to stave off the enemy, no matter where the battlefield. Would you consider cyber warfare a battle we must not lose? How does the AAC protect itself? Is training important here, too?

Cyber warfare is definitely a battle we must not lose. When it comes to cyber issues, the AAC's concerns are no different than those of the rest of the Army — or the Department of Defense, the government at large, and the commercial sector. This is a National issue. We are all concerned with protecting the integrity of our data, limiting data access to those who appropriately warrant it, protecting property rights, and maintaining freedom of use of our information systems. The possibility for exploitation or corruption of information by potential antagonists, or even simple hackers, is obviously a legitimate concern.

Part of the solution is clearly the application of information assurance technology to our enterprise systems. Examples include intelligent agent technologies to monitor and interdict intrusions, firewalls, multi-level security capabilities, and encryption for sensitive systems. Training also plays a role in terms of making sure that our members employ effective operations security practices in their day-to-day activities. This is a challenge that government and industry must tackle together.

Is it possible to keep pace, or even better, be ahead of the game, acquiring state-of-the-art equipment and systems for the Army, while still staying within Congressional budgetary constraints? Is there a concern of having to "make do" with lesser technologies? How does the AAC achieve this balancing act?

There is nothing new here. The AAC has always attempted to balance cost with capability. Recently, however, we have adjusted the gain on the cost piece of the equation to give it relatively equal weight with performance. As importantly, the Army has elevated the importance of life cycle cost in the evaluation of systems acquisition. Success in the implementation of Cost As an Independent Variable initiatives and Life Cycle Cost control (or Total Ownership Cost Reduction) will go a long way toward helping afford the necessary technologies the Army needs to be successful in bringing about the objective force.

Industry now leads technology development in almost all areas, but most importantly in information technology. The Army's laboratories and program executive offices need to leverage this strength and participate in the development of the standards that will become the commercial norm. By injecting Army requirements into the standards development process, we get away from the enormous cost of modifying components to get to a "military version" or having special production lines to produce a military variant. We also need to critically examine the application of existing commercial standards — to look for applicability not exclusion.

We have had significant successes in streamlining our processes and saving critical resources. As we improve our processes, through both implementation of technology and training of our workforce, we can reduce the "overhead" associated with our acquisition process and thereby increase the proportion of our resources that go to the actual design and fielding of technologies for our warfighters. We live within the reality of the budgetary constraints every day, and it is our duty to the taxpayers to ensure that we are making the most of the resources they give us. Deploying the best tools and methods, along with training our people, can ensure that we can get the best technology, from the best source, for the warfighter.

Let's talk about Contractor Logistics Support [CLS] and Prime Vendor Support [PVS]: how does this really break down?

The Army has used Contractor Logistics Support [CLS] for years in both peacetime and wartime environments. CLS is not a new phenomenon. Contractor Logistics Support permits non-military entities to play a direct and vital role in providing materiel, services, technical expertise, support and/or maintenance to the military.

I am disappointed the bureaucracy has stalled this effort for three years. We did not adequately address the working capital fund issues while we addressed depot concerns and have still not found a satisfactory answer. Army leadership still believes there is value to implementation of a Prime Vendor Support program and continues to explore means of implementation.

Do the risks outweigh the benefits?

Where implemented to date, contractor logistics support has had a positive effect on readiness.

Is it plausible to have civilian contractors on the battlefield backing up trained, professional warfighters?

As a matter of policy, civilian contractors may be employed in areas of operation, as required, in support of U.S. Army operations and/or weapon systems. Generally contractors will be assigned at Echelons above Division [EAD]; however, the Commander in Chief [CINC] may determine their services are required in the forward areas, consistent with the terms of the contract and the tactical situation. Contractors are non-combatants and while not considered a substitute for force structure, may be able to support armed forces in new, innovative ways in the 21st century that we have not thought about yet.

Are you worried about introducing too much privatization and contracting of personnel?

First, let me start by saying that privatization addresses an institutional practice. It, like CLS, is nothing new. I am not worried about privatization of selected support functions where a risk assessment has deemed it feasible. For support of direct combat functions, organic support is preferred.

While one of the benefits might be saving money, won't you lose some control over quality and timeliness?

The Army has responsibility for several core processes, the generation of requirements, the establishment and maintenance of priorities, the safeguarding of resources, and serving as a smart buyer. So long as privatization and contractor logistics support functions do not compromise these responsibilities and our workforce is adequately trained to manage these activities, I do not believe we need to sacrifice quality, timeliness, or appropriate government control over product. The contractor is responsible for the materiel, the support, the service, or the requirement to fix and/or repair equipment; however, control of contractor personnel is specified in the terms and conditions of the contract.

You're on the record as saying training and education are very critical to the future of AAC; from your viewpoint, is DSMC doing its job in educating the Army acquisition workforce? What could we do better to give your workforce the acquisition education they deserve?

DSMC is just one element of the education/training system in place for the acquisition workforce. The Defense Acquisition University [DAU] is a DoD education and training institution that pro-



"Acquisition reform opened the door to new ways of doing business and mandated migration of the workforce from one that approached acquisition from a lock-step, risk-averse templated process to one of innovation, flexibility, and measured risk."

vides mandatory, assignment-specific, and continuing education courses for military and civilian personnel.

The DAU/DSMC has made substantial progress in its effort to provide a full range of basic, intermediate, advanced, and assignment-specific courses to support the career goals and professional developments of the acquisition workforce, but must continue to pursue innovation and change in two ways. DAU and DSMC must continue to look for innovation in the way they provide instruction. These schools must also exe-

cute their mission in a way that instills a spirit of innovation in its graduates.

One of the things we have learned looking across industry and corporate universities is that they tend to use practitioners as short-term educators for their workforce. Using this concept gives them the advantage of educators who have first-hand, current knowledge of the corporate activities/subjects being taught. We think the DAU structure could substantially benefit from this approach.

We also use multiple public and private universities for education and training. Among these are the University of Texas Senior Service Fellowship Program, the acquisition-related master's degree programs at the Naval Postgraduate School, and the School of Choice, which allows workforce members to obtain degrees at schools in their local areas. The AAC does this in addition to other numerous leadership training opportunities.

What do you want your folks to say about your tenure as military deputy to the Army Acquisition Executive once your title becomes former military deputy?

I would like them to say I cared about the people — that they be trained, qualified to support the Army, and could see a career path that was personally rewarding and motivating. The Army is going through change — downsizing, transforming, and moving from an Industrial to an Information Age. I hope I have supported the Army without losing sight of the people.

On a personal note, what is the best advice you ever received, be it from a friend, colleague, or a family member, to prepare you for the position you now occupy as the Military Deputy to the Army Acquisition Executive?

Take your job seriously, but look at yourself with a sense of humor.

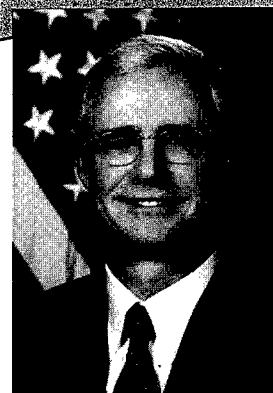
Gansler Issues New Performance-Based Services Acquisition (PBSA) Guidance



ACQUISITION AND
TECHNOLOGY

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010

APR - 5 2000



MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTORS, DEFENSE AGENCIES
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Performance-Based **Services Acquisition (PBSA)**

As services become an increasingly significant component of what the Department buys, we must ensure that we acquire them effectively and efficiently. That is why the use of performance-based acquisition strategies for services remains among my highest priorities. This is important for all functional communities involved in the service acquisition process. It is the policy of the Department of Defense (DOD) that, in order to maximize performance, innovation, and competition, often at lower cost, performance-based strategies for the acquisition of services are to be used wherever possible. While not all acquisitions for services can be conducted in a performance-based manner, the vast majority can. Those cases in which performance-based strategies are not employed should become the exceptions.

In order to ensure that the Department continually realizes these savings and performance gains, I establish, at a minimum, that **50 percent** of service acquisitions, measured both in dollars and actions, are to be performance-based by the year **2005**. To achieve this goal, I further direct that the Military Departments and the Defense Logistics Agency develop a **PBSA** implementation plan to increase the use of performance-based service acquisition strategies within their organizations not later than **60 days** from the date of this memorandum. In addition, training is essential to increasing performance-based acquisition for services, and I am committed to providing to the acquisition workforce the training and tools needed to define, acquire, and manage service requirements efficiently and effectively. For example, the National Association of Purchasing Management and the National Contract Management Association have each collaborated in the development of a **PBSA** course, available via the Internet or for on-site team training. I ask that you ensure that your relevant workforce take this or equivalent performance-based services acquisition training within the next **12 months**. As well, **PBSA** templates and guidebooks will be available to the entire workforce by May **2000**.

The attachment provides the necessary details regarding the **PBSA** implementation plan, training requirements, and other Department-wide **PBSA** initiatives. The use of true performance-based strategies for the acquisition of services offers great benefits to the Department. I look forward to your efforts to ensure the fullest possible implementation of such strategies.

J.S. Gansler

Attachment
As stated



Editor's Note: This information is in the public domain. To download the attachment to Dr. Gansler's memorandum, go to the Defense Acquisition Reform Web site at <http://www.acq.osd.mil/ar/vpreport8-99/mainmenu.htm>.

NATO Evaluating ALIS - Acquisition Logistics Information System Technology Demonstrator

Logistics Software Demonstrator Based
On Rapid Acquisition Development

METIN ICHISAR • CHRISTIAN LAPAQUE • SYLVAIN NOËL

Editor's Note: For a complete list of acronyms and abbreviations appearing in the text and figures of this article, refer to p. 12.

As the North Atlantic Treaty Organization (NATO) enters the 21st century, a large amount of information interchange is increasingly required to support NATO's trans-Atlantic acquisition logistics activities. In all probability, NATO partners have used very different information systems for a long time, across a very diverse array of defense systems. Now they are faced with the need to establish, update, and exchange digital information in different formats and with different meanings, using expensive and inefficient interfaces.

The NATO Continuous Acquisition and Life Cycle Support (NATO CALS) organization is building a data model based on an "entity relation" format (formalism) within the now well-known NATO CALS Pilot Project, more commonly known as NCPP No. 1. This large collaborative project involves experts from both government and industry. A core model, the NATO CALS Data Model (NCDM) covers three major activities of acquisition logistics: logistics support analysis, technical documentation, and material support.

Ichisar, Lapaque, and Noël have been working five years on the impact of new information technology (IT) as it affects military/industrial logistics, and the logical linkage between systems engineering and life cycle support.

ALIS Demonstrator

The Acquisition Logistics Information System (ALIS) technology demonstrator enables users to work with an Integrated Weapon System Database, compliant with older legacy systems, to evaluate its benefits to both military and industry. Legacy refers to making an older system compatible with new systems and technologies, and the reverse. For one year, NATO nations — government and industry — will have the opportunity to conduct their own tests and make their own judgments. The ALIS demonstrator is being evaluated under a joint contract involving GIAT Industries of France and ISS Inc., a U.S. firm.

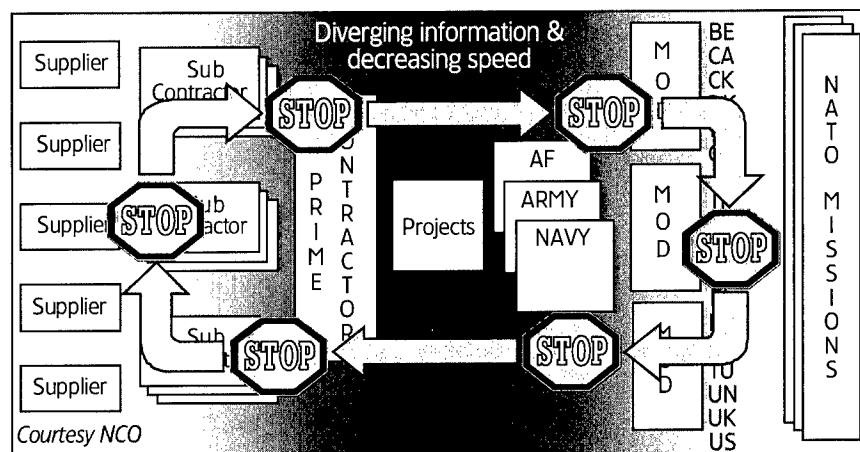
NATO's defense information systems' remodeling is similar to a bottom-up approach, based on operational needs from beginning to end. Remodeling is a major ongoing collaborative program, provid-

ing both military and industrial requirements for reconfigurable forces systems and agile enterprise, and vice versa. NATO CALS projects are the current result of a joint U.S./European initiative to create a CALS Organization within NATO capable of implementing the following strategies/initiatives:

- Make international cooperation easier and more flexible (agile).
- Stop and reverse a cost spiral that might come, not only from technology, but also from management.
- Re-establish orderly and appropriate methods within the defense industry, acquisition, and procurement to create a seamless process.

The NATO CALS Organization launched NCPP No. 1 five years ago, working jointly with the NATO CALS Management Board (NCMB) and NATO

FIGURE 1. Existing Software Rules Decrease Speed & Reliability

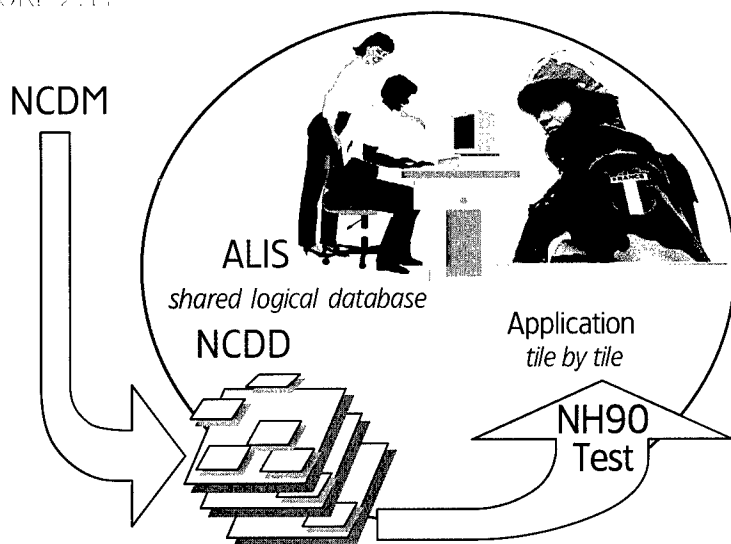


Number of interfaces = $N(N-1)$ where N is the number of systems.

ACRONYMS AND ABBREVIATIONS

AECMA	European Association for Aerospace Industries	MIL-PRF	Military Performance Specification
AGUSTA	Helicopter Manufacturer (Italian)	MIL-STD	Military Standard
ALIS	Acquisition Logistics Information System/ Advanced Logistics Information System	MoD	Ministry of Defence
ALDB	Acquisition Logistics Database	MRO	Maintenance Repair Overhaul
ALS	Acquisition Logistics Support	MS	Maintenance Support
AP	Application Protocol	NATO	North Atlantic Treaty Organization
bdr	battle damage repair	NATO CALS	NATO Continuous Acquisition Life Cycle Support
CALS	Continuous Acquisition Life Cycle Support	NCDD	NATO CALS Data Dictionary
CALS/CE	CALS Concurrent Engineering	NCDM	NATO CALS Data Model
DASA	Daimler Aerospace Systems (German)	NCMB	NATO CALS Management Board
DGA	Délégation Générale pour l'Armement (French MoD Armaments Authority)	NCO	NATO CALS Organization
EC	Electronic Commerce	NCPP No. 1	NATO CALS Pilot Project Number 1
EDI	Electronic Data Interchange	NICG	NATO Industry CALS Group
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport	OCCAR	Organisme Conjoint de Coopération en matière d'Armement (Organization for Joint Armament Cooperation)
FMECA	Failure Modes, Effects, and Criticality Analysis	OLA	Operational Logistics Activity
HLA	High Level Architecture	PDM	Product Data Management
HW	Hardware	PLCS	Product Life Cycle Standards
IDE	Integrated Data Environment	PPMG	Pilot Project Management Group
IDEF1X	Integrated Computer-aided Manufacturing DEFinition Method 1X	RAD	Rapid Acquisition Development
IDEF0	Integrated Computer-aided Manufacturing (ICAM) DEFinition Method 0	RCM	Reliability Center Maintainability
ILS	Integrated Logistics Support	Rfb	Request feedback
Inst	Instruction	SGML	Standard Generalized Markup Language
ISO	International Standards Organization	STEP	Standard for the Exchange of Product Model Data
IT	Information Technology	SW	Software
IWSDB	Integrated Weapon System Database	TechDoc	Technical Documentation
JCALs	Joint CALS	TL	Through Life (HLA)
LAN	Local Area Network	UK-CIC	United Kingdom-CALS International Congress
LMI	Logistics Management Information	UK MoD	United Kingdom Ministry of Defence
LORA	Level of Repair Analysis	UN	United Nations
LSA	Logistics Support Analysis	VAN	Vertical Area Networks
MIL-HDBK	Military Handbook		

FIGURE 2.1. *ALIS and NCDD*



Industrial CALS Group (NICG). Elaine Litman of the United States was the NCMB chairwoman; and Henri Martre of France was the NICG chairman. The projects had previously started as a result of three Workshops:

ACQUISITION WORKSHOP

(PROGRAMMES D'ARMEMENT)

Organized by France, the Acquisition Workshop (Programmes d'armement) explained the main ideas on which Acquisition Process Reform and Smart Procurement are still based today — integrated teams and continuous process improvement. The results remain general because systems engineering is more relevant for individual nations than for NATO, which supports the position of the Organisme Conjoint de Coopération

en matière d'Armement (OCCAR), or Organization for Joint Armament Cooperation.

ACQUISITION LOGISTICS WORKSHOP

(LOGISTIQUE DES SYSTÈMES D'ARMES)

Organized by the United Kingdom, the Acquisition Logistics Workshop (Logistique des systèmes d'armes) was the platform for launching NCPP No. 1. This forum is focused on the pilot project as well as the ALIS platform, which is one of the tasks of NCPP No. 1, Phase II.

OPERATIONAL LOGISTICS WORKSHOP

(LOGISTIQUE OPÉRATIONNELLE)

Organized by Germany, the Operational Logistics Workshop (Logistique opérationnelle) is now called the Operational

Logistics Activity (OLA). It will bring the elements needed for implementation of the NCDM to the military forces. The United Kingdom Ministry of Defence (UK MoD) gave a decisive and initial push to the NCPP No. 1 by funding the modeling works of Phase I. Germany provided the industrial start-up of Phase II by running the rig-test and closely supporting the launch of the ALIS contract (Task 2.1) by the Délégation Générale pour l'Armement (DGA)/CALS (DGA/CALS).

Significant information flows are now expected to run across multiple organizational boundaries throughout the weapons system life cycle. Each of these boundaries creates a fracture line that may slow or even block not only information flows, but also the capabilities to do the expected jobs and missions (Figure 1).

The number of interfaces grows as $N*(N-1)$ when N is the number of systems; for example, with only nine organizations, as many as 72 interfaces would be needed.

Consider what would happen in our business context just on the government side if we had 19 nations, each with three or four Services (if we included the Naval Air Services)! This means that we would have to shift to another paradigm (Figure 2).

Spearheaded by the French Ministry of Defence/Délégation Générale pour l'Armement (MoD/DGA) (i.e., Acquisition, Procurement, and Technology), the ALIS contract is the specific contribution of France to the NATO CALS work during NCPP No. 1, Phase II.

CALS Consistency

Implementing the initiatives and strategies embodied in CALS improves system engineering (Rapid Prototyping) and the logistics organization (Virtual Enterprise) (Figure 3). In addition, CALS promotes concurrent and shared effort from "factory-to-foxhole" in four important areas:

- Reduces Lead Time
- Reduces "Down Time"

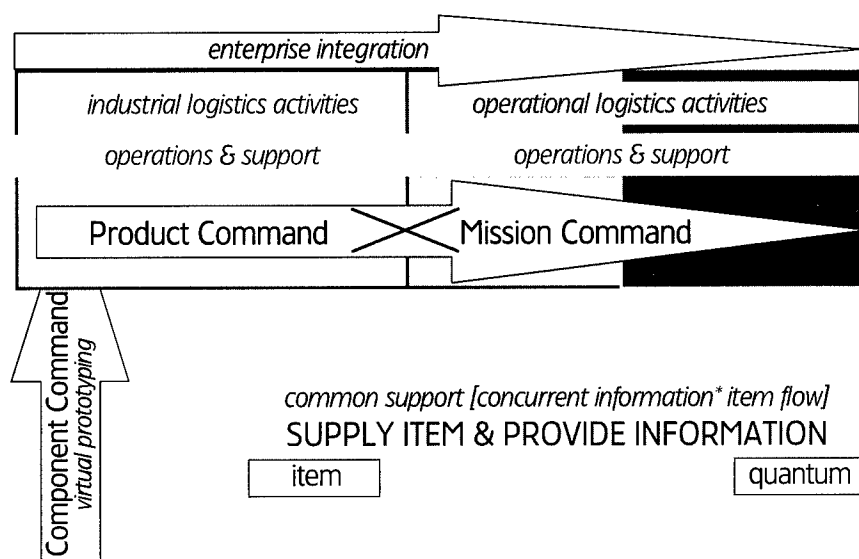
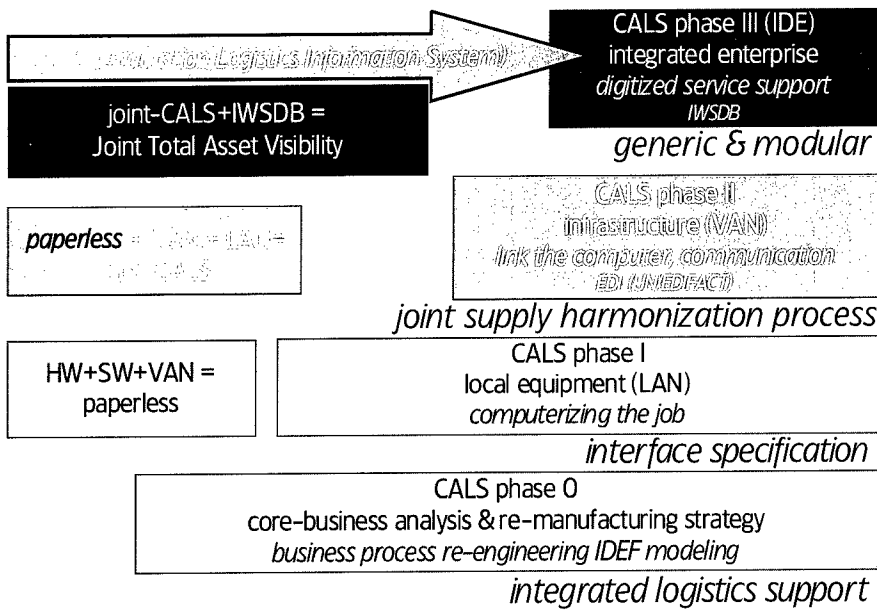


FIGURE 4. CALS Effective Strategy



- Reduces Cost
- Improves Quality.

Further, this customer-oriented initiative provides speed and agility between autonomous partners. A continuous process, CALS also brings a "clean room process" to the situation by empowering players with basic skills. As we delve more deeply into CALS, we also receive benefits from information technology (IT). In this area, the ALIS demonstrator is certainly a valued contribution. And as we deal more with IT, we benefit from work already done on an operational and industrial level (providing the next step is taken). But we should not forget that we are still, to a certain extent, in the definition phase. IT requires an incremental approach and strategy (continuous process).

The next step involving the NATO CALS Data Model and the NATO CALS Data Dictionary (after its first fielding application) requires ALIS to go from a proposed model to the advanced model. At this point, it is time to call ALIS the *Advanced Logistics Information System* vs. the *Acquisition Logistics Information System*. To achieve rapid and accurate evolution from proposed model to advanced model requires very strong cooperation between both industry and the military, based on their common interests.

ALIS & CALS

The word CALS is common in the United States, but the concept is not commonly used in Europe. The meaning of the acronym stabilized in 1989-90, and CALS is still defined as continuous life cycle support. From an initial identification of means (computers and software), we understand today that the accent is on the scope itself: a seamless process reducing time and cost on the whole life cycle. The acronym and the concept are now accepted worldwide. Together, they address the general question: What are the most appropriate

ways, standards, and models to benefit from continually evolving IT in every branch of business?

CALS Initiative Strategy

We know the start-up of CALS came from benchmarking, which was conducted by DoD's Defense Advanced Research Projects Agency (DARPA), of the best industrial practices, especially from the automotive industry (Figure 4). CALS is no longer viewed as a purely technical approach (the initial CALS Standards, Standard Generalized Markup Language [SGML], and others). Instead, it has become progressively understood as an attempt to introduce a holistic approach to defense and industry, emulating the best worldwide practices — including, for example, those in Japan (material management) and those in Europe (complex systems engineering).

Originally, the question was: "How can the U.S. DoD — both Operational Forces and Acquisition community, or Forces and Procurement — use software to improve the logistics process in a more coordinated manner between the different Service components (Army, Air Force, Navy)?"

The first answers were purely technical: digitize documents, store logistics data from Integrated Logistics Support (ILS) methods [CALS phase 0], and adopt some common data standards, such as

FIGURE 5. Joint Shared Logical Database

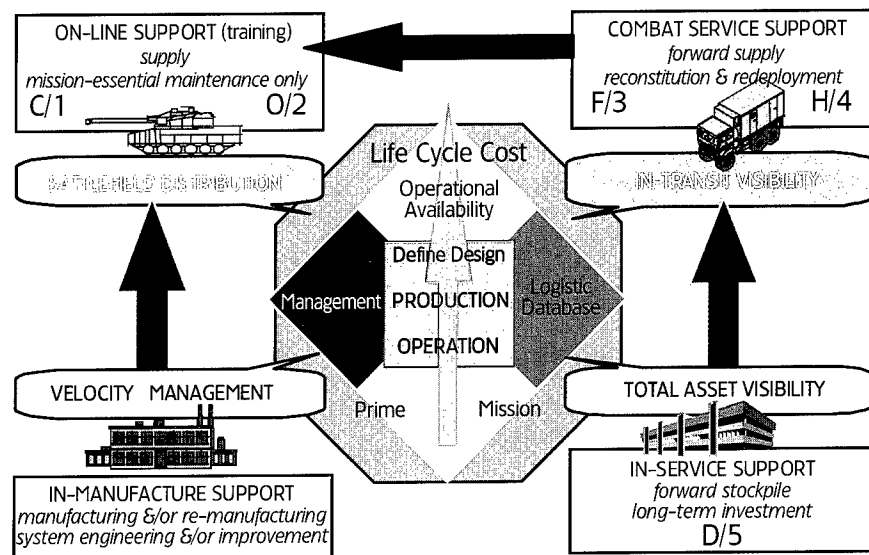
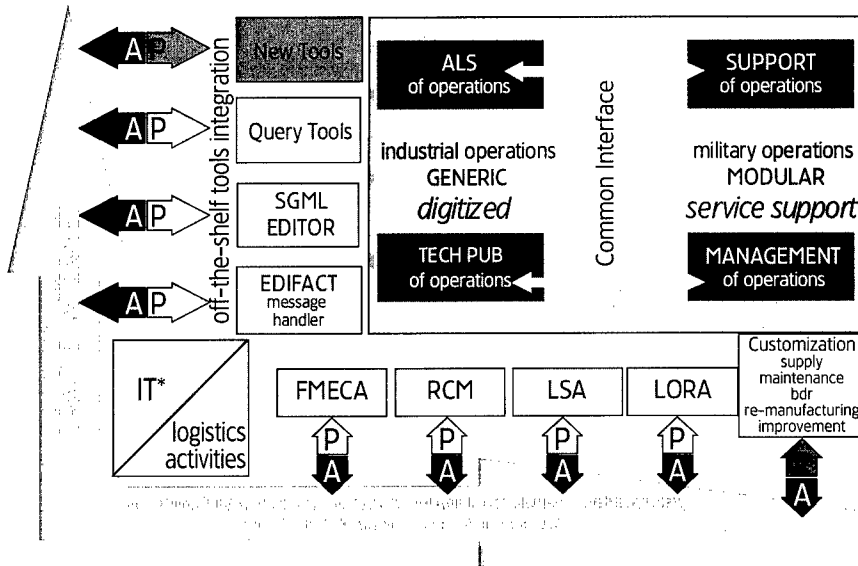


FIGURE 6. ALIS Structure-ISO 10303 STEP Data Model: Common Interface



SGML for execution. This appeared as CALS initiative Phase I: testing and evaluation of the first techniques of digitization.

Then the era of Electronic Data Interchange (EDI) arrived. Europe led the way with EDI for Administration, Commerce and Transport (EDIFACT), with Airbus Industrie and Systeme d'échange technique (SET). The United States followed by implementing electronic commerce with PDES, Inc., using STEP (Standard for Exchange of Product Model Data), which is the International Standards Organization [ISO]-recognized standard. The era of EDI called for new semantic models and definition of features. This could be considered CALS initiative Phase II.

Eventually, the idea that data could be memorized once, manipulated, and then used several times over was seen as evidence of economic savings and added value; thus, CALS addressed not only the logistics process but the whole life cycle – including design and development, production, deployment, and disposal. In addition, it promoted concurrent engineering (CALS/CE) and today's systems engineering.

CALS Phase III marked the maturity of the initiative, enabling the exchange of information to be automated, potentially

worldwide, by incorporating the following features/characteristics:

- Virtual Prototyping ("concurrent" information in order to define, design, engineer, and produce an object).
- Integration of information and resources in correlation to the material flow, in order to assemble a product, service, or mission.
- Material Structure or breakdown (e.g., STEP Application Protocol [AP] 204) to link object and product.

Rapid prototyping and incremental processing are the two main characteristics that new IT provides for the improvement of engineering and logistics organizations.

Joint Shared Logical Database

Figure 5 was inspired from a draft by the first U.S. CALS teams 10 years ago. *Joint Total Asset Visibility* defines the concept of a shared, logical database – the key to progress and flexibility. The shared logical database preserves the legacy and gives the necessary freedom of operation: access(es) can be shared between information systems that are naturally different, only on the basis of necessary logical relations within a clear legal status.

The octagon symbolizes the need to generalize weapon-system information sharing on its life cycle, from "factory-to-fox-

hole." This is almost always done when manufacturing ammunition and running healthcare systems, and is also being applied to the automotive industry.

Battlefield Distribution, U.S. Army; In-transit Visibility, Joint; Velocity Management, U.S. Navy; Total Asset Visibility, U.S. Air Force are the different focuses for the re-engineering of the logistics functions within the CALS initiative. Linked to the basic core functions, they do not have to be re-invented and need to be shared by equivalent organizations in the United States and Europe.

Real Time is the first factor of information reliability. Briefly stated, speed and reliability will create safe and efficient organizations through more reliable information. Today, this is the major way to reduce costs, especially those costs that lack good metrics.

ALIS Structure-ISO 10303 STEP

ALIS is an open (i.e., agile) technology demonstrator (Figure 6). In fact, through the information object module, ALIS allows linkage to any kind of information all along the life cycle, with proper software-version management. It then becomes an experimental platform for logistics re-engineering from "factory-to-foxhole."

This platform is an emulation, built from the existing tools and data under the current standards:

- ISO 10303-STEP.
- Former Military Standard (MIL-STD) 1388 2B (now Military Handbook [MIL-HDBK] 502 and Military Performance Specification [MIL-PRF] 49506).
- European Association for Aerospace Industries (AECMA)/ATA 2000M (EDI-oriented).
- AECMA/ATA 1000D (improvement over the last platform upon which it was running).

Legacy, Life Cycle Support Improvement

This approach allows the crossing of future skills and existing ones (Figure 7).

FIGURE 7. Factory EIS Cycle Support Improvement

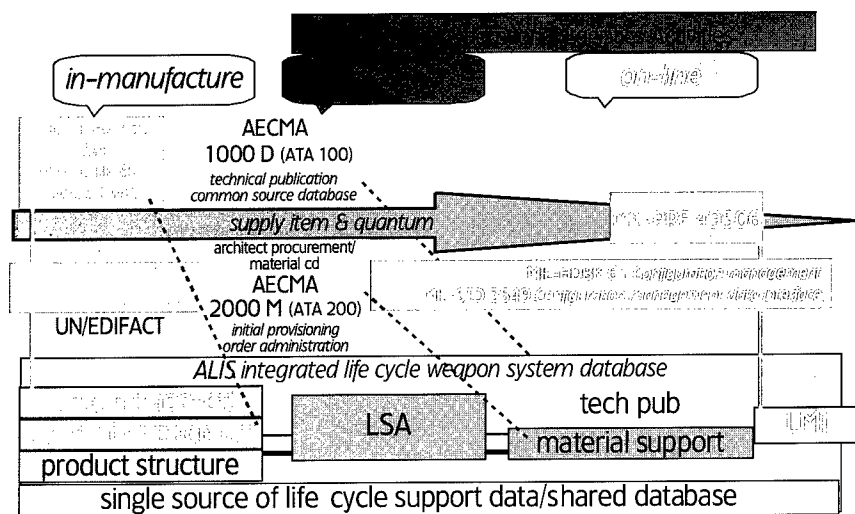
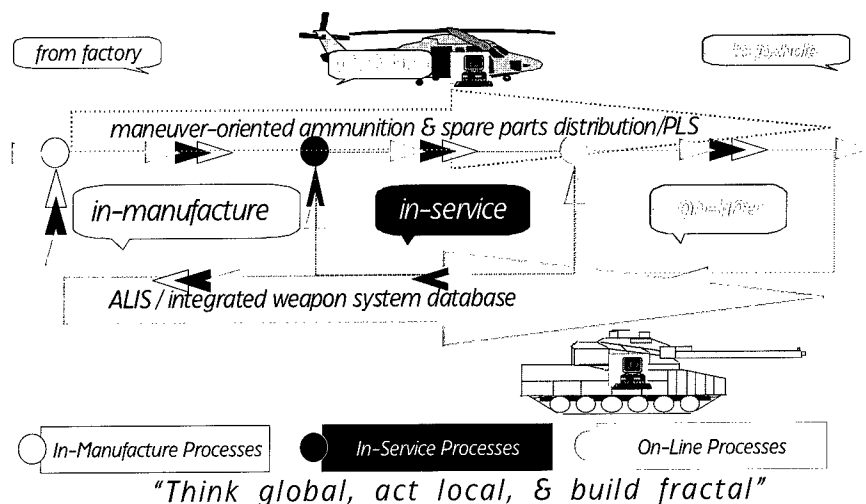


FIGURE 8. Factory EIS Cycle Support Improvement



This simple fact demonstrates the necessary agility of the ALIS platform, because it is not possible to modernize logistics without any consideration for legacy systems. ALIS demonstrates and validates the implementation capability of the NCDM V3.0. The requirements came from the NCPP No. 1 Phase I, task 1.6: specifying functional tests needed to demonstrate the validity and efficiency of the model.

The technical analysis needed to answer this requirement was completed within the NCPP No. 1 organization:

The NATO CALS Pilot Project Management Group, NATO CALS Organization (NCO), and NATO Industry CALS

Group (NICG) are all part of the NATO CALS Pilot Project (NCPP), or NCCP No. 1., co-chaired by Vincenzo Bunotempo and Admiral Ispettore Vene of Italy, with the participation of international experts. Currently, members are working on several different tasks as part of the technical analysis:

- DASA or Daimler Aerospace Systems (German) for Material Support.
- AGUSTA, a Helicopter Manufacturer (Italian) for logistics support analysis (LSA).
- ECF, or Eurocoter France, a German-French company, for technical documentation (TechDoc).
- A U.S. and French consortium, organized by the French MoD Armaments Authority, or DGA (Délégation Générale pour l'Armement) for the contract.
- Pilot Project Management Group (PPMG) for the request.

Also key to technical analysis of the ALIS platform was the knowledge necessary to make sure ALIS covers weapon systems architecture (long-life systems) as well as advanced software and logistics (including operations and support) from the perspective of both industry and deployed forces. This knowledge is shared by GIAT Industries of France, the European leader in land defence armament; Integrated Support Systems., Inc., of Seneca, S.C., the recognized leader in product support data management software; and Sonovision-Itep of France for

FIGURE 9. Factory EIS Cycle Support Improvement

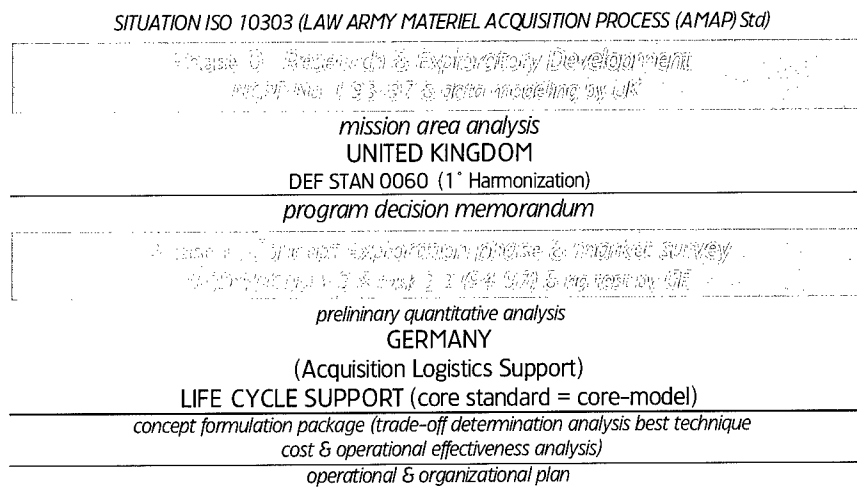
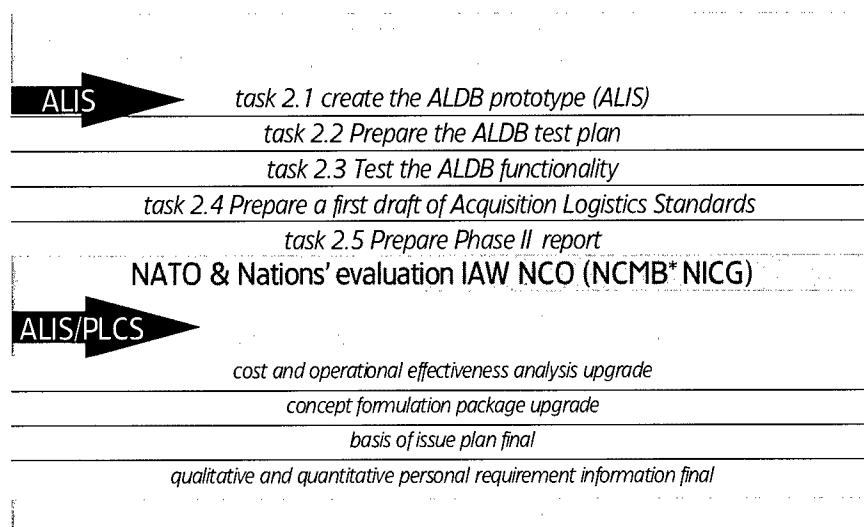


FIGURE 10. FROM THE STEP TO THE ALIS



technical documentation, or TechDoc — the technical information accompanying industrial products and systems to allow end-users to operate and maintain them.

The structure of the ALIS platform is very modular. Software components are available off-the-shelf and have already been replaced since the initial proposal; they will be replaced again as new software tools are offered in the marketplace. Other features include:

- ALIS uses some software from ISS, Inc.
- The user interface is written in Java.
- ALIS platform implementation with the NCDM also demonstrates the maturity of the CALS initiative.

From NCPP No. 1 to Shared Logical Database

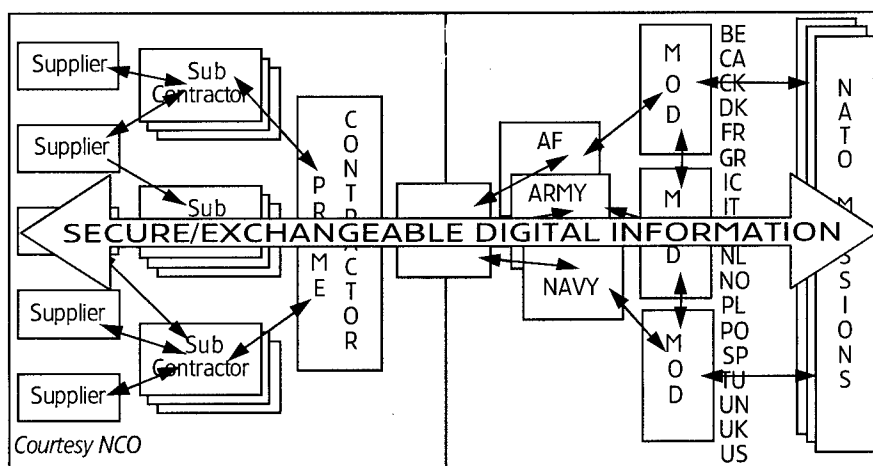
The crux of any organization is stability. This is especially true with logistics in view of the seeming inertia across the total spectrum of national defense systems, coupled with the cost involved (Figure 8). A general purpose architecture for interoperability, or high-level architecture (HLA) facilitates the remodeling of logistics from "factory-to-foxhole," i.e., customer-oriented, ensuring high-level consistency for both military and industrial operations, independent of the current technology. Only with the structured stability of HLA can logistics be remodeled to reduce operating costs, encourage joint operations (both for military and industry), and fa-

cilitate the diffusion of IT, which provides users the supply item information they need. In the implementation of the STEP approach, the supply chain gives the information neutral fiber; agility comes from the linkage between information and material flows.

NATO CALS Organization Effort

The ALIS technology demonstrator opens the door to NCPP No. 1, Phase III, Industrialization (Figure 8). At this stage, users can get more directly involved in CALS Phase III and derive benefits from IT. It should be easier for Europeans due to the necessity for cooperation and a shared understanding of the holistic approach. The ALIS platform is certainly a contribution to that approach, which comes from IT and requires a continuous process (Figure 9).

FIGURE 11. FROM THE STEP TO THE ALIS



NCPP No. 1 Shared Property

The next step should be taken through very strong trans-Atlantic cooperation, including (on the European side at least) the United Kingdom, Germany, Italy, and France. Both defense industry and the military need to be friendly and open so the civil area can converge on the ISO/STEP level (Figure 10).

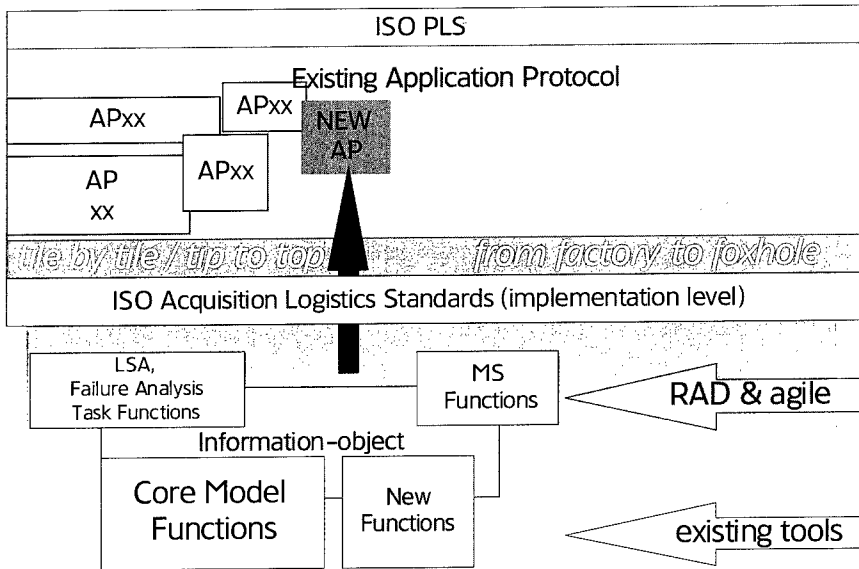
Let us consider the business context of a multinational program. On the industrial side, a weapon system is likely to be designed and manufactured by one or more prime contractors formed by different companies. These prime contractors operate through an extended chain of subcontractors and suppliers.

On the government side, the national and inter-allied defense systems are likely to be operated by several armed forces of different nationalities. The system may also be deployed as part of a multinational combined task force to operate anywhere in the world.

As stated at the beginning of this article, large information interchange is required more and more for all activities. In all probability, partners have used very different information systems for a long time, but now they need to establish, update, and exchange digital information in different formats and with different meanings, by using expensive and inefficient interfaces.

Clearly the conversion of information into digital format will improve all busi-

FIGURE 12. ALIS Start-up — The Product Life Cycle Standards (PLCS)



ness activities. We need to define secure and exchangeable information during the life cycle of the weapon system (Figure 11).

We must have the capability to circulate data coming from different shared databases of different countries; with the constraint that each country (and each prime contractor) will not have to rebuild its own current systems. Product data are totally covered in real time from both user and producer points of view.

ALIS Supports the Product Life Cycle

ISO 10303 standard (STEP) already facilitates sharing and exchanging product technical information through some application protocols. A Product Data Management (PDM) approach is well suited to logistics activities — provided a data model, a data dictionary, pertinent algorithms, and a logistics application protocol are defined and recognized (Figure 12).

Applying and exploiting the extension of STEP to logistics, industries will be able to produce any system in cooperation. Information will be attached to the shared product and will remain independent from each current

and proprietary information system. The capability to supply items and provide information quantity in accordance with the running of the existing and common supply chain will ensure agility.

The higher the speed, the lower the cost, and the better the reliability. The cost to introduce the STEP approach in logistics is low: You only have to pay 30 percent of the software costs once. Due to the relative inefficiency of information systems, engineers working on complex

systems currently lose 30 percent of their time looking for the relevant information they need.

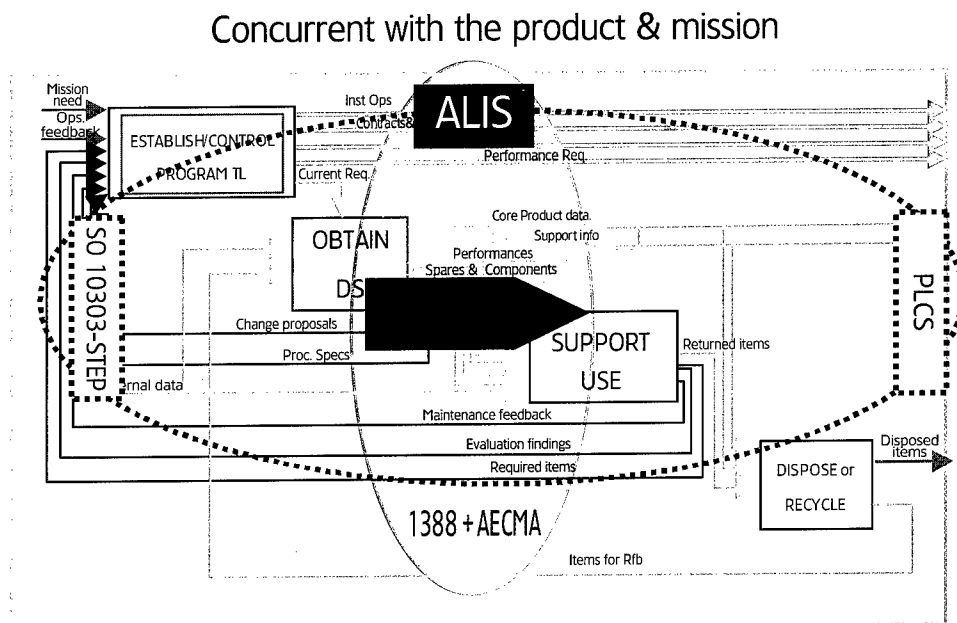
The impact on each skill will be low, because the data dictionary is built from the current standards (MIL-STD 502/MIL-PRF 49506, and AECMA/ATA Spec). Industrial consequences are immediate: It will be possible to quickly share the data of systems under development, whatever current information systems might be. This is a good answer to the political concerns for European and Trans-Atlantic cooperation (Figure 13).

Open and Shared Contributions

A product has to answer the needs for which it is designed (or for the market). Financial availability and industrial capability are the constraints. Therefore, we have to provide the right answers to meet users' logistics needs and support their respective logistics functions, at a cost they can afford. Such support might include any of the following areas:

- Battle damage repair; supply; or logistics maintenance for weapon systems online.
- Complete overhaul; test and inspection; or repair for logistics maintenance of weapon systems in service.

FIGURE 13. ALIS Supports the Product Life Cycle



- Restoration; improvement; manufacturing and system engineering for in-manufacturing support.

IDE Logistics Architecture Frame

The commonality of supply chain (spare parts integrated with current production) and a logistics information system (provides information) guarantee speed, low cost, and availability; that means that the higher-level logistics architecture is becoming increasingly common, as an example, between a military organization such as the Tank-automotive Armaments Command (TACOM) and the automotive industry (the necessary changes having been made).

Without entering into any further details, obviously this is a highly complex problem with a wide range of dynamic (e.g., management) and stable (e.g., product) information being established and continuously updated across the 20 or 30 years of the life cycle (Figure 14). The control and management during the life cycle, the in-manufacture support, the in-service support, and finally the disposal are in fact constrained more by the duration of the life cycle than by the military organization.

With ALIS we have only to distribute the effort between the design, logistics support, modeling and simulation, and test and development activities. It is the core of the model that we need; we have now only to deal with in-manufacture support, in-service support, and on-line support to be able to produce the information flow between partners in different time zones and locations, using all of their own information systems.

And the challenge for the defense industry is to share, as much as possible, the logistics approach with civilian industry: It remains the best way to cut costs. The combat specificity requires agility and reconfiguration capability. This is also a fundamental quality of the best industry practices. Therefore, the NATO CALS effort to consolidate a shared logical database model for life cycle product support is not only now possible – but it is the right time for we and our NATO partners to conduct ex-

periments. Won't you join us in evaluating and supporting the NATO CALS ALIS technology demonstrator?

Editor's Note: Editing and translation assistance was provided by **Greg Caruth** and **Army Lt. Col. Lise M. Gagne**. Caruth is Director of the DSMC Press. Gagne is currently a DSMC professor in the Program Management and Leadership Department. Her former assignment was as the Commander, U.S. Army Research, Development and Standardization Group – France (USARDSG-FR).

END NOTES

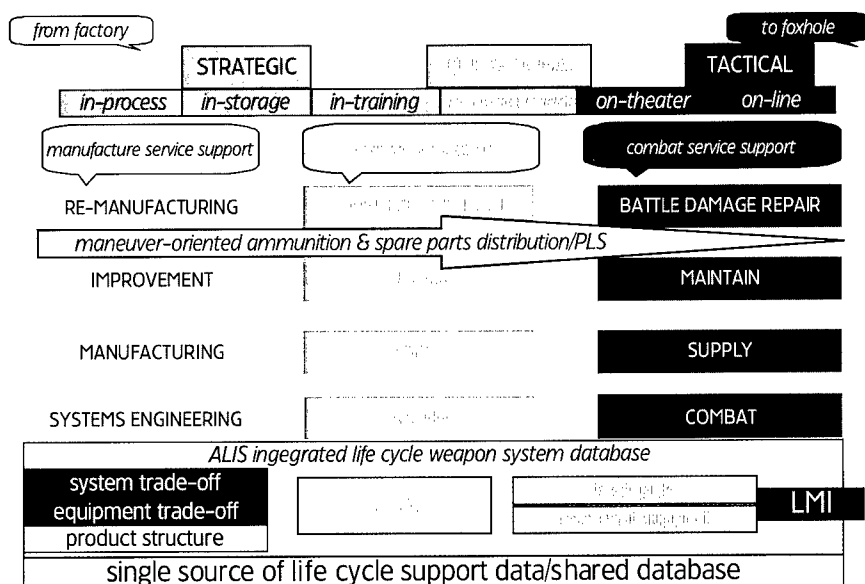
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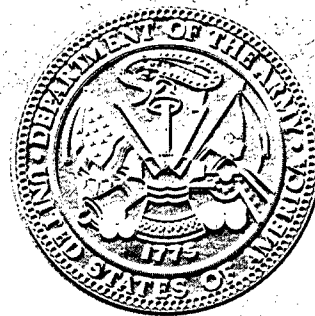
Christian Lapaque is the ALIS joint-contractor and contributes to the Logistics Quality Evaluation Book for the European automotive industry. He is working with the United Kingdom CALS International Congress (UK-CIC) Logistics

Support Working Group to establish common European logistics practices, and with MRO in the aircraft industry. He was initial product manager of the ISO logistics® program (supply chain support). Retired from the French Army, he served as an officer in a mechanized infantry unit, and on the technical staff of the Army as an antitank combat developer. During Desert Storm, he was the special advisor to the French Headquarters Commander for improvements in online jamming capabilities as well as countermeasures. He graduated from the French War School, specializing in manufacturing, test and evaluation (1978); and architecture, missile, and tank design (1984). (christian.LAPAQUE@wanadoo.fr)

Sylvain Noël, has extensive experience in Definition and Design (D&D) and project management, shipbuilding, ordnance engineering, and manufacturing. Within these activities, he applied virtual prototyping CALS principles, particularly for modeling and flexible manufacturing (Tulle). He was the former manager of the French Ministry of Defence (MoD) CALS Office. He is the initiator of the ALIS project and a member of the NCMB/NICG (NATO CALS Management Board/NATO Industry CALS Group). He is a graduate of the French Ecole polytechnique. (noel@dial.oleane.com)

FIGURE 14. Life Cycle Support and Information Flow





Foreign Military Sales Program

World's largest "Garage Sale"

DENISE CALABRIA

AIERSLAUTERN, Germany (Army News Service) — When faced with an accumulation of household goods that are no longer needed, rather than discard them, savvy consumers utilize garage sales or thrift shops.

That way, they not only recoup some of their original investment, but save resources, and possibly help those in need acquire items they might otherwise be unable to afford. It is a classic example of a "win-win" situation.

That same idea also holds true for excess or outdated military supplies. Although it's unlikely you'll see a used tank or HMMWV [High Mobility Multipurpose Wheeled Vehicle] parked alongside the highway with a banner saying, "For Sale — Only One Previous Owner," the U.S. Army does have a method for recouping taxpayers' dollars on excess and outdated equipment while encouraging internal order and development in foreign countries.

That program is known as the Foreign Military Sales [FMS] program and is the responsibility of the 200th Materiel Management Center [MMC], a 21st Theater Support Command [TSC] subordinate unit.

At the helm of the FMS operation is Web Rose, Chief of the 200th MMC International Logistics Office. Rose heads the two-person operation that oversees the sale of outdated or excess U.S. military equipment to countries around the world.

The FMS policies derive from U.S. statutes, presidential directives, and policies of the Departments of State and Defense. The United States offers to sell defense articles and services (including training) under FMS procedures only in response to specific requests from authorized representatives from for-

eign governments or eligible international organizations.

In other words, Web Rose does not decide to whom we can sell equipment. He does, however, facilitate the sale to representatives from around the globe.

"I am ultimately responsible for representing the 21st TSC when we have equipment that has been formally declared excess by the National Inventory Control Panels," said Rose. "The active-duty units throughout USAREUR [U.S. Army Europe] who, by virtue of the modernization program are getting new equipment, offer up their outdated equipment as excess rather than turning it in to the Defense Reutilization Management Office. We take these numbers of vehicles and offer them up to the U. S. Army Security Assistance Command who, in turn, offers them up to the Department of the Army [DA]."

From there, DA passes the excess numbers to the Defense Security Cooperation Agency, [which] works jointly with all branches of the military and the State Department. Often, it is Congress that decides if a country can have particular equipment, usually based upon political considerations.

From a financial standpoint, once a country declares they would like certain equipment it has the opportunity to conduct a Joint Visual Inspection [JVI]. If it decides it wants the equipment, it pays for the packaging, crating and handling, and the transportation back to the home country.

According to Rose, "Each one of our Joint Visual Inspections is different from the other. We have had people of all ranks — from sergeants to two-star generals — coming in to inspect equipment, so it certainly is a high-visibility operation."

There is also a high level of interest when the equipment arrives in the recipient country. "I've known of numerous occasions that CNN has been on hand when vehicles were being off-loaded from a ship," said Rose. "The spreading of democracy is not something taken lightly. It's very big and has high visibility."

Sales to foreign militaries save money in two ways.

First, the United States doesn't have to move the equipment to DRMO [Defense Reutilization and Marketing Office]. Second, cost savings are realized by not having to demilitarize — the act of breaking down and/or melting down particular types of equipment or weapons.

Sales conditions of the FMS program are also similar to those of a garage or yard sale. All equipment is always offered in "As is/Where is" condition. Should the country require the equipment be upgraded, they will be charged accordingly.

Additionally, there is no return policy offered with FMS arrangements.

"What you see is what you get," said Rose. "That's why it's important the countries realize the ramifications if they decide to waive the JVI."

Since the beginning of the drawdown era, the ILO has transferred equipment to approximately 45 countries worldwide; they are dealing with 25 countries at the present time.

Typically, the equipment offered to foreign countries is tactical wheeled and track vehicles, small arms, tactical radios, and ammunition rounds. The trans-

ferred equipment previously was located in 23 storage sites — all but five of which are now closed — throughout Germany, The Netherlands, Belgium, Luxembourg, The United Kingdom, and Italy.

The ILO also can be involved in equipment relocation programs known as Presidential Drawdowns. For political reasons, the president may decide that equipment will be sent to a specific country. He determines that all service branches will collectively join together to move certain equipment to a particular country.

"Under those circumstances," said Rose, "the Department of Defense will 'bite the bullet' for the shipping costs. The country does not pay."

Rose also has moved equipment to foreign countries to meet emergency needs, such as moving vehicles to a country that had experienced a major earthquake.

The FMS program does more than save money. It offers cost avoidance, good will, and even emergency/humanitarian assistance.

"It helps strengthen our coalition countries," Rose summarized. "In the long run, if we help the countries who are helping us, it goes both ways. One hand washes the other."

How many garage sales can make that claim?

Editor's Note: Calabria works at the 21st Theater Support Command Public Affairs Office. This information is in the public domain at http://www.dtic.mil/armylink/news/index_30.html on the ArmyLINK Web site.

A Total Systems Life Cycle View on Reducing Cycle Time

"Three Lenses Provide the Right Customer Focus"

LT. COL. BRIAN BRODFUEHRER, U.S. AIR FORCE

As far back as the 1986 Packard Commission, reducing cycle time was recognized as crucial to any genuine reform of DoD's acquisition system. According to the Commission's report, *A Formula for Action*, "An unreasonably long acquisition cycle — 10 to 15 years for our major weapon systems ... is a central problem from which most other acquisition problems stem:

- It leads to unnecessarily high cost of development...
- It leads to obsolete technology in our fielded equipment...
- It aggravates the very gold plating that is one of its causes...."

This article looks at cycle time reductions from a *total systems life cycle* perspective. The total systems life cycle perspective ensures that short-term reductions in the development cycle are not lost later through delays in maintaining and modifying the system. Such short-term reductions and savings may lead to unsatisfied customers and higher long-term operations and support costs.

Also in this article, I describe industry best practices, providing a systems view of cycle time reduction, including a list of tools to apply and a list of factors that influence applications of the tools. From my perspective as an instructor at the Defense Systems Management College, this article continues my efforts to emphasize and support development of creative problem-solving skills for application to program management scenarios

requiring quick reaction and astute change management.

Framework for a Total Systems View

"Reducing Cycle Time" means providing a capability to a customer in less time. In the commercial arena, reducing cycle time might mean getting a new product to market in less time than the previous product version, important because of the need to stay ahead of the competition. The time to get that product to market, the macro-cycle, is made up of micro-cycles all contributing in some way to that top-level time metric. These micro-cycles, or sub-processes, consist of different activities that, together, make up the product development process. These include such functions as requirements definition; the analysis and decomposition of the requirements into designs and drawings; and the production and testing of systems (both hardware and software) for delivery to the customer. Looking at the DoD system in an analogous way, the macro-cycle is the time it takes the acquisition community to deliver supportable products to the customers, the requirements community (users), or the warfighters.

Three interlinked systems — the acquisition process; the requirements process; and the Planning, Programming, and Budgeting System process — define this macro-cycle. The most effective treatment of cycle time reduction would address changes at the macro level of each of these three different systems. However, making changes at a level encom-

passing these three systems is generally out of the scope of influence of most program managers; thus, the focus of this article is on achieving cycle time reductions *within* the constraints of the three macro-systems, not from trying to *change* those systems.

The process program managers can best influence is the acquisition process of the specific systems they manage. Focusing on cycle time reductions at that level can contribute to an overall reduction in the time it takes to deliver a capability to the warfighter. Ideally, these reductions will be achieved by managers at the Program Office level as they work with their industry counterparts, functional support staff, working Integrated Product Teams (IPT), and customers.

Scope of the Term "Reducing Cycle Time"

"Where over the product's life is this 'cycle' that is being reduced?" "Where is the cycle measured?" The more important question we might first ask is, "What cycles are important to *customers*?" The answer to that question is embodied in time as viewed through three different lenses:

- First is the initial *time to get the product* (acquisition cycle time). Reducing that time results in a quicker response to the defined

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threat, mission need, or operational requirement.

- Second is the *time it takes to support* (maintain and repair) the system (logistics cycle time).¹ Reducing that cycle time improves the availability of the system to support mission requirements quickly and consistently.
- Third is the *time it takes to improve or upgrade the system* to respond to new threats or requirements, to fix system shortfalls, or to improve system reliability (evolutionary cycle time).

Therefore, when an acquisition strategy is developed to "reduce cycle time," it should, at a minimum, address issues that arise when looking at the problem

from at least these three views. Understandably, delivering a product to warfighters quickly but leaving them with a system that 1) does not meet performance expectations; 2) cannot be easily maintained; or 3) cannot be improved when the threat changes, has not effectively reduced cycle time from the long-term perspective.

Motivation to Reduce Cycle Time

In a competitive commercial sector, taking too long to get a product to market can drive a company out of business, as will taking too long to support or improve the product. In DoD, prolonging the time required to meet users' requirements lowers customer satisfaction, costs more money, and is not responsive to the changing threat environment. The last point is perhaps most important in that failure to meet the changing threat means failure to meet the military's most essential requirement of defending the nation.

The acquisition workforce, charged with developing systems and weapons to counter any perceived threats to the nation's security, now faces ever-increasing challenges. In recent years, three factors have emerged, resulting in rapid changes in the threat environment.

- First is a larger number of potential enemies, driven by breakup of the former Union of Soviet Socialist Republics, or USSR; and increase in the number of rogue aggressors, such as terrorist groups.

- Second is the rise of a more global economy resulting in less restricted sharing of technology.
- Third is the rapid growth of technology, particularly in the computer and communications industry sectors.

These three factors combine synergistically to make future threats increasingly elusive and powerful. Altogether or perhaps even separately, these threats will continue to churn a rapidly changing environment — one requiring quick, effective responses to maintain a secure national defense.

Technology Insertion and Reduced Cycle Times

Effective application of new technology is one force multiplier that the United States uses to its advantage in countering threats, dominating the battlespace, and maintaining information superiority. New technology, when properly inserted into a program, can improve both performance and supportability.

One characteristic of new technology (especially in the electronics, information systems, and communications areas) is that it changes so rapidly. Keeping up with these changes is vital, both from the perspective of knowing what our global competitors are doing with the technology, and of knowing how to best apply advanced technology to serve our nation's interests.

When technology platforms change significantly every 18 months, but we [DoD] cannot deliver new capability any faster than 10 years out, we fail to leverage the improved capabilities of advanced technologies. Reducing cycle time enables effective use of new technology for the warfighter.

To effectively leverage new technology, program managers should first understand the DoD process for developing new technology and transitioning it into the warfighting arsenal.

Understanding the process is a critical tool to reducing cycle time. This process is covered in the Defense Systems Man-

Cycle time reductions

must be kept within the bounds of a scientific or principle-based product development process that has been proven over time.

agement College Advanced Program Management Course (APMC) and Advanced Systems Planning, Research, Development and Engineering Course (ASPRDEC) curricula, among others.²

Cautions on Reducing Cycle Time

When reducing cycle time, be careful — cut the fat, not muscle or bone. Neither the acquisition community nor the warfighters are satisfied by serving up platitudes like doing “more with less” without identifying a realistic, prioritized approach as a guide.

Recent failures in the satellite and launch community and in the National Aeronautics and Space Administration Mars program have raised questions about the way the “better, faster, cheaper” approach was implemented in those arenas.³ Shortcuts that omit important technical management activities may be false economies. Likewise, cycle time reduction must be done in a way that is intuitively supported as being common sense at all levels of the organization. Leadership’s most effective improvements come from making strategic decisions on *what* to work on and *what not* to work on. So it is with cycle time. Workers’ improvements come naturally from finding better ways of doing the job assigned.

Reductions must be kept within the bounds of a scientific or principle-based product development process that has been proven over time.⁴ Use prudence in tailoring this process for a particular program; do not compromise the disciplines that define the process.

Metrics

Four metrics are available for program managers to measure the success of cycle time reduction strategies:

- First is *time*. Does the strategy effectively reduce the time in the three dimensions described earlier — acquisition, logistics, and evolutionary?
- Second is *cost*. Does the strategy consider the life cycle or total ownership cost of the product? This includes development, acquisition, operations and support, and disposal costs.

- Third is *customer satisfaction*. Does the system meet requirements? Would the customer come back or recommend your service to another customer?
- Fourth is *resource management* (money or manpower). Are your people taken care of; would they work with you again on another project? Is the project well managed? Would your boss give you another project? This last metric measures the resilience of the acquisition management system, and its ability to continue to support the warfighter and the taxpayer at a particular operations tempo.

Cycle Time Reduction Tools

Several cycle reduction tools are available for program managers. For purposes of this article, I grouped these tools into three categories originating in a study on defining next-generation products.⁵ In this study, two Silicon Valley consultants (Tabrizi, Walleigh) examined 28 next-generation product-development projects and identified best practices that led to success. These practices were then placed in three categories: product strategy, project organization, and execution in the definition phase.

The following discussion on tools applicable for reducing cycle time with a total systems approach, uses that study as a framework. The best practices from the study have been converted to tools here and were also adjusted so that they conform to DoD-applied terminology. Other best practices were added to the framework, where appropriate.

Establish a Relationship with the User

WORK CLOSELY WITH THE USER

Maintain a continual dialogue with the customer or user, including the entire customer base — the maintainers and trainers, in addition to the operators. Share information on technical trends, updates on progress, and possible applications of new products. Understand how the user will use and support the system. Talk to users about the current systems to understand their shortfalls. Excellent communication with the customers early in the product strategy phase will result in less scrap and rework later in the process, less time and cost

spent in Initial Operational Test and Evaluation, and higher customer satisfaction.

Use Cost As an Independent Variable (CAIV)

This tool is a framework to bring cost constraints into any dialogue with the user. It requires setting aggressive cost objectives early in the process of defining a new product or of changing an existing product. The acquisition and requirements community must work closely to identify options and make trades between performance and cost. Effective use of Cost As an Independent Variable (CAIV) can reduce cycle time by proper setting of expectations early in the process and requiring less scrap and rework at the end. Design to Cost is a sub-tool that can be used to implement top-level CAIV objectives by allocating those constraints to lower levels of the program.⁶

Develop an Integrated Road Map

The road map contains at least two levels:

- How, over time, does this system fit with other systems with which it is to operate?
- How, over time, will this system evolve and integrate its various sub-components?

The road map should be a living document, updated at regular intervals or when major externally generated changes occur. This tool saves time by smart, forward-thinking change management. Changes in the form of new requirements, diminishing parts sources, software upgrades, supportability upgrades, and changing technology will impact the program. Planning to bundle those changes into discrete blocks at regular intervals will reduce the number of blocks required, thus reducing the testing required and the management of different configurations in the field. This reduces both the acquisition and supportability time.⁷

Use an Evolutionary Approach

Evolutionary development or acquisition consists of working closely with the users to deliver increments of capability in complete, discrete, and ex-

panding cycles. The first cycle addresses the mission deficiency as currently known today or some portion of that deficiency. A system is defined, built, tested, and fielded in a rapid but controlled manner. The control is applied by following a systems engineering process. The evolution continues to the next cycle as changes such as new threats or technology improvements or sustainability needs arise. This cycle repeats the same process, accounting now for the new information and requirements. Additional information about this evolutionary approach appears at the end of this article.^{8,9}

DEVELOP COMPREHENSIVE OPTION STRATEGIES FOR THE USER

Options developed to reduce cycle time should consider the three time dimensions discussed earlier (acquisition, logistics, evolutionary). Systems delivered quickly but with high maintainability and upgrade overhead are of limited value in today's environment of rapidly changing technology. Initially, they may appear to have reduced cycle time, only to revert to much longer cycle times downstream. Options developed for the user should identify life cycle cost and ease with which a system can be upgraded. Downstream producibility, supportability, and "upgradeability" constraints should be included as part of the requirements definition and design processes — again, this points to using a systems engineering process. The user, or customer, should be advised of these three long-term aspects of each option offered, in addition to the immediate cost and schedule.

Building effective option strategies requires training of both engineers and marketing personnel in the up-front design factors that impact these downstream product characteristics. Company design manuals should contain techniques that show the impact of today's decisions on tomorrow's customer operational cost and workload. Customers then become informed consumers, and can adjust the long-term road map if today's cost and schedule constraints require delivery of a less supportable or producible system.

USE OPEN SYSTEMS ARCHITECTURES (OSA)
The Joint Technical Architecture (JTA) sets the standards for DoD communications — standards absolutely crucial to DoD's mission of protecting the nation. Such standards must promote interoperability among the Services, a required characteristic for joint and allied operations. The JTA is continually evolving and is currently at Version 3.¹⁰

Key to DoD's interoperability initiative is a design (and business) tool that recognizes and accommodates change called Open Systems Architecture (OSA). An OSA places the design focus on commonly used and widely supported interface standards. Think of OSA in terms of the axle-wheel-tire interfaces employed on commercial cars. By adhering to common standards at the interfaces, the consumer can buy tires from a multitude of suppliers, rather than being forced to buy from a single source, as might be the case if the interface characteristics were unique.¹¹ This approach can also be seen in electrical wall sockets, VHS video recorders, and personal computer clones.

Moreover, using OSA reduces cycle time and effectively leverages technology from the commercial marketplace. Commonly used interface standards permit several suppliers to provide products instead of tying the customer to only one.

In some industrial sectors (such as information technology), the commercial marketplace is driving technology improvements at a much greater rate than in the defense-related industrial base. OSA enables the use of this technology. It also extends the usable life span of major weapons systems (such as the B-52 or C-130) by facilitating the upgrade of avionics systems. It takes much less time to modify an F-18 or F-16 than it does to build a new fighter.

The process program managers can best influence is the acquisition process of the specific systems they manage. Focusing on cycle time reductions at that level can contribute to an overall reduction in the time it takes to deliver a capability to the warfighter.

USE PRODUCT PLATFORM FOR SOFTWARE DEVELOPMENT

This is a tool that ties in well with OSA and also accommodates changes. Meyer and Seliger define a product platform as a set of subsystems and interfaces that forms a common structure from which a stream of derivative products can be efficiently developed and produced.¹² These are also called reference architectures. The efficiency is measurable in terms of cost and time required to generate products from underlying platforms. A set of computing infrastructure and application building blocks form a platform from which springs any number of different applications that can be applied to different markets or customers. The time to produce a capability is thus reduced because of the existence of the common platform, enabling the development effort to focus only on the different application software.

REDUCE THE GAPS BETWEEN EVOLUTIONARY CAPABILITY INCREMENTS

Between one large increment in capability and the next will be performance gaps. These gaps represent valid user needs that may go temporarily unfilled. There might also be gaps in sup-

portability or training that need to be filled in with finer increments leading to the next evolutionary block. Companies successful in the commercial sector at developing new products fill gaps between platform releases with "derivative products."¹³ This concept could be applied to the defense sector by providing interim releases of minor support products to aid in the existing performance shortfall until the new block evolves.

Form the Team Based On the Difference Factor or "Newness" of the Product

Capturing new markets or developing systems that represent a significant leap in performance could well require a new and separate group to develop. A new team could also be required if the culture required to produce or operate the system (due to new technology) was significantly changed. If established cultures and processes will not support the new product, then establish a new team in an environment that will support growth of the new culture. An existing team could well handle smaller changes in performance.

Phase the Team's Staffing Mix

Too many engineers early in the project could result in excessive and frustrating "wheel spinning" while the requirements are in flux. Too few later in the project result in work overload. One successful company adds new people to the original small team after it completes the initial specifications. Typically, successful companies use just a few senior experts during the initial phase of the program. Senior marketing experts with a good grasp of both technology and the market work with senior technical experts who have a good grasp of risks, technology obstacles, cost and time constraints. Their experience and influence enable ideas developed early on to carry through to the product development phase, thus reducing time.

Track Progress and Sustain Urgency

The study found that the root causes of delays were managerial in nature: lack

of processes to monitor time and paying insufficient attention to the routine details of the product definition process. A disciplined systems engineering process integrated with an earned value management system provides an effective way to track progress. Other tools leading to success follow.

Use A Product-Priority Document

The customer's product-requirements document (the Operational Requirements Document in DoD acquisition terminology) is prioritized into categories such as "must have," "should have," and "nice to have." Thresholds and goals would be two applicable categories. This prioritization supports trade-off discussions with the user that might go as follows: "If we add this feature, our cost will grow by x dollars and our development schedule will be slowed by y months. Are you willing to pay more and wait longer?"

Two tools discussed earlier in this article – CAIV and building complete option strategies – can aid these discussions with the users.

Develop Early Prototypes

Successful companies move quickly to prototype key subsystems and then the entire system. These more realistic representations of the system energized the development team and enabled fruitful, more focused discussions, resulting in quicker decisions. Typically, these companies involved customers with the evaluation of the prototypes and used their comments to converge on the final product design. "The customer dialogue does not delay product development. Rather, it provides a continuous stream of market information that helps shape derivatives and revisions."¹⁴

Demonstrations

The best practices of early prototypes are analogous to the DoD practice of using demonstrations. DoD prefers these methods of assessing and reducing concept risk and assessing military utility of alternative technologies.¹⁵

Use Development Partnerships

Successful companies partnered with suppliers or with other companies that

brought technical or financial strengths to the partnership that they lacked. Together, they handled disagreements at the working level, not "by contract amendments or litigation."¹⁶ Sharing people and technology allowed differences, whether in specifications or culture, to narrow. Likewise, DoD program offices can partner with other DoD organizations, e.g., laboratories, to take advantage of specific strengths that the program office may lack.

Develop A Two-Track Strategy For Primary Systems And Derivative Products

Tabrizi found that major system changes, whether new starts or major modifications, or large evolutionary steps tend to have: high uncertainty, specifications that need to evolve over time before they are finalized, initial staffing requirements met by a few key people, and fewer milestones required up front for effective tracking. Alternatively, derivative products (sometimes referred to as "precedented systems" or gap filling changes) tend to have low uncertainty, specifications that are defined quickly, higher staffing requirements, and more detailed, closer-spaced milestones required for effective tracking.

The differences in these two types of developments should be reflected in the strategies placed in the product development road map. Tailoring the development strategy to the size of the development can reduce time required to develop small increments or product derivatives and will appropriately adjust the time required for larger leaps of change.

Factors Influencing Tool Selection

The tools/best practices listed in this article are provided as options to work the problem of reducing the time it takes to deliver a capability to the warfighter. Applying the right tool to fit the circumstance is also important. A wrench can be used as a hammer and a screwdriver as an awl, but it will likely take longer and not be as effective.

This section discusses factors to consider when selecting tools to reduce cycle time. All these factors will impact

the selection of acquisition strategy, the implementation of strategy through the selection of the tools discussed earlier, and the tailoring of the acquisition process to the needs of the specific program.

Phase of the Acquisition Program

Is this program a new start, one that DoD has already fielded, or one that is being modified? Many of the tools discussed earlier apply to all three situations. However, OSA can be applied more readily to a new start than to a program that has already been designed. Certainly, use of OSA on a fielded system will require more thought on the part of developers and users. For instance:

- How long will the system continue to be fielded?
- What is the cost of a new architecture?
- Can the architecture be upgraded incrementally?

Another key aspect of working with an existing program is that any changes must be carefully worked into the stream of the ongoing program.

- If the program is in production, how will the change be incorporated into the factory floor?
- If it is already fielded, how will changes be made?
- Will they be made in a depot or by maintainers in the field?
- How long can the systems reasonably be out of service?

Impacts of Change

Two aspects of change are influential when deciding which tools to select. The first is the rate of change of the environment. Faster changing environments require shorter response cycles; more time is available when the threat is not changing as rapidly. The second is the degree of change from cycle to cycle. Risks are higher for larger changes, and more time may be required to complete a successful program.

Maturity of the Technology

Assessing maturity of the technology being inserted is an important part of determining risk associated with the

change. This risk assessment will impact the selection of a reasonable time for delivery of the change to the user. Inserting immature technology will increase cost and schedule risks of the development and production program as well as drive up operations and support costs.

Learning and Applying

This article looked at cycle time reductions from a total systems perspective. Cycle time reductions not well thought out early in the definition phase are likely to be swallowed up by large delays and unsatisfied customers later on. Rather than simply disseminate policy statements on cycle time reduction, my intent was to inform and challenge students (and PM readers) to learn and

apply specifics based on industry best practices in their own programs.

In summary, a thorough understanding of a systems life cycle view of cycle time reduction, including all three lenses of cycle time reduction (acquisition, logistics, and evolutionary) is critical to reducing cycle time. Armed with tools that are based on industry best practices, the acquisition workforce at large, I believe, can better develop and apply the strategies discussed in this article to effectively reduce cycle time.

Editor's Note: The author welcomes questions or comments on this article. Contact him at brodfuehrer_brian@dsmc.dsmc.mil.

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APMC 00-1 STUDENTS VISIT AMF, INC. IN RICHMOND, VA.

Students from DSMC's 14-week Advanced Program Management Course (APMC 00-1) recently visited the world's largest bowling company, AMF, Inc., as part of a Manufacturing Management class assignment. AMF, located in Richmond, Va., was founded in 1900 as American Machine and Foundry, a manufacturer of tobacco farming machinery. Today, AMF is the world's largest bowling company, operating 545 bowling centers worldwide, with 60 million customer visits per year. AMF makes and sells bowling equipment worldwide, including automatic pin spotters, automated lane cleaners/oils, sophisticated scoring equipment, bowling pins, lanes, ball returns, bags, shoes, and other bowling-related products.

Students relished the opportunity to observe first-hand manufacturing processes recently studied in the classroom. During the visit, they reviewed AMF's manufacturing practices to determine whether the company used Lean Manufacturing Model principles in their manufacturing processes. Not only is the company operating under Lean Manufacturing Model principles, students found that AMF is very sensitive to how lean manufacturing principles can improve their manufacturing operation and profit.

Over the years, student feedback consistently reflects that many APMC students typically characterize industry field trips as an extremely valuable experience at DSMC — one that gives them a heightened awareness of acquisition reform and industry's role in implementing best practices.



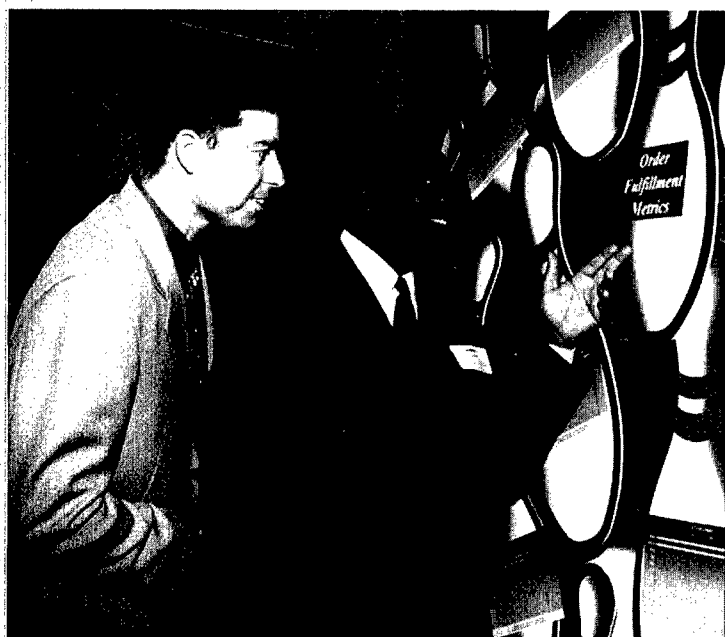
APMC 00-1 students are welcomed to AMF, Inc., Richmond, Va. From left: Edmond Kowalski; John Hurthere; Richard Majer; Eileen Gruber; Janet Masters, AMF Human Resources Manager; Air Force Maj. James Hardy; Army Maj. Lyndon Wrighten Sr.



From left: Eileen Gruber and Richard Majer watch as an AMF worker drills thumb and finger holes in a bowling ball.

DENTS "BOWLED MOND FACILITY

From left: John Hurthere and Army Maj. Lyndon Wrighten Sr. review the AMF Order Fulfillment metrics scoreboard.



From left: An AMF worker briefs and demonstrates to Air Force Maj. James Hardy and Edmond Kowalski construction and testing of some of the electronic equipment produced by AMF.



From left: Eileen Gruber and Army Maj. Lyndon Wrighten Sr. take notes as AMF Human Resources Manager, Janet Masters explains AMF's manufacturing facility layout as part of AMF's Lean Enterprise Manufacturing improvements.

Richard Majer inspects the raw material for AMF's plastics molding operation at the AMF factory in Richmond, Va.



Congressional Testimony

EXCERPTS FROM STATEMENT OF

**THE HONORABLE
DR. JACQUES S. GANSLER**

Under Secretary of Defense, Acquisition,
Technology and Logistics



DR. DELORES M. ETTER

Deputy Director
Defense Research and Engineering

BEFORE
**SENATE ARMED SERVICES COMMITTEE
EMERGING THREATS AND CAPABILITIES SUBCOMMITTEE
DEFENSE-WIDE RESEARCH AND DEVELOPMENT**
March 21, 2000

Editor's Note: The following text contains excerpts from testimony by Dr. Gansler and Dr. Etter before the Senate Armed Services Committee March 21. To download the entire testimony, visit ACQWeb at <http://www.acq.osd.mil/acqweb/usd/>.

r. Chairman and Members of the Subcommittee: We appreciate the opportunity to appear before you today to report on a wide range of research and development issues. However, before taking your questions, we would like to spend a few minutes giving you our perspective on where we are today in providing our forces with the best equipment and support possible, and where we want to be — both in the near future and within the next 10 or 20 years — and how research and development plays a key role in that future.

Responding to New Threats

The 1997 Quadrennial Defense Review outlined the prospect of continued global dangers and established our strategic goals for meeting projected threats in the early 21st century. It is our strategy to promote regional peacekeeping efforts; to prevent or reduce conflicts and threats; to deter aggression and coercion; and to respond to the full spectrum of potential crises. In order to carry out this strategy, the U.S. military must be prepared to conduct multiple, concurrent, contingency operations worldwide. It must

be able to do so in any environment, including one in which an adversary uses asymmetric means, such as nuclear, biological, or chemical weapons. Our combat forces must be organized, trained, equipped, and managed with multiple missions in mind.

The security environment in which we live is dynamic and uncertain, replete with a host of threats and challenges that have the potential to grow more deadly. We are not facing a few disorganized political zealots armed with pistols and hand grenades. Rather, we must defend against well-organized forces armed with sophisticated, deadly weapons and access to advanced information and technology. They represent a different and difficult challenge to forces organized and equipped around traditional missions (particularly when we must also continue to expend significant resources to be equally prepared for potential, more traditional missions).

Future, hostile forces are unlikely to attempt to match overwhelming U.S. superiority on a plane-for-plane, ship-for-ship, or tank-for-tank basis, but are more likely to use asymmetrical strategies against us — including weapons of mass destruction, information warfare, and large quantities of relatively low-cost cruise and ballistic missiles. They can also utilize commercial navigation, communications, and imagery satellites.

The Defense Science Board, in its 1998 Summer Study Task Force Report on our

response to transnational threats, warned that, today, even an adversary with a relatively small defense budget can become a significant regional threat and, increasingly, can project (or threaten to project) this threat worldwide. It noted that this smaller adversary could present a nontraditional military force as deadly and destructive as large conventional forces. Military conflict is being dramatically transformed by the rapidly changing nature of modern technology.

Of course, this is nothing new. Throughout history, advances in technology have directly and indirectly transformed the course of warfare. From spear and longbow, to the invention of gunpowder and dynamite, to the use of aircraft and the machine gun, and on to chemical, nuclear, and biological weapons, as well as the current information age, we have seen how revolutionary advances in weaponry have influenced the nature and extent of combat.

The Revolution in Military Affairs and Business Affairs

How do we counter these changing threats and keep ahead of accelerated modernization by the new adversaries facing us in the early 21st century? Clearly, we must perform better than they do and retain our vast superiority in the quality of our personnel and in our forces' mobility, global projection, and weapon technology. These, combined with information superiority, will assure our nation's future security posture.

REVOLUTION IN MILITARY AFFAIRS

Our vision for the 21st century is a warfighting force that is fast, lean, mobile, and prepared for battle with total battlespace situational awareness and information assurance. Our military strategy, as stated in the Joint Chiefs of Staff *Joint Vision 2010* posture statement, is to be based on Information Superiority — real-time intelligence from "sensor to shooter." When combined with precision weapon delivery, this is the backbone of the "Revolution In Military Affairs" that will allow us to achieve total battlefield dominance.

Dominance of the 21st century's digital battlefield will come only to those able to "see" clearly across all intelligence disciplines and maintain a constant stream of information to decision makers, warfighters, and to a new breed of "brilliant" weapons. Modern, so-called "reconnaissance/strike" warfare (often referred to as the essence of the Revolution in Military Affairs) is based on real-time, all-weather, accurate, and secure information systems, combined with long-range, unmanned, "brilliant," highly lethal weapons designed to achieve precision kills. Put more simply, we must be able to find, follow, and engage the enemy with lethal force, using weapons that allow us the flexibility to quickly modify the mission parameters. The digitized battlefield will provide commanders at all levels the information needed for complete situational awareness, and it will allow the acquisition, exchange, and employment of information to support planning and execution in a joint network-centric battlespace. Moreover, the cornerstone of this network-centric warfare is the use of satellites, ground terminal equipment, and modern radios that provide the sensor-to-shooter links so vital to future warfighting.

The 21st century battlespace will also require an entirely new generation of advanced technology on the battlefield — from improved sensor technology to an increased ability to identify moving targets, to far better systems-of-systems integration, not to mention a renewed examination of remote piloted vehicles as platforms for both delivery and observa-

... The complexity, tempo, and dispersion of current military operations stresses traditional training and education systems based in the classroom ... time spent in on-site education and training impacts operational readiness. Development of new learning technologies to address these concerns and provide cost-effective systems will provide high-quality, "learner-centric" systems for military training and education.

tion. Many of these requirements are of course already the targets of our research and development efforts: for instance, hyperspectral imaging will provide us a new resource for "nowhere to hide" capability, including characterization of hardened and deeply buried targets.

REVOLUTION IN BUSINESS AFFAIRS

To help pay for this Revolution in Military Affairs, Secretary Cohen announced in November of 1997 the Defense Reform Initiative. The DRI, as it is called, is a basic restructuring of the way the Department does business. It calls for a Revolution in Business Affairs. Although our military is unquestionably the strongest in the world, our defense establishment has labored under outdated and outmoded policies, procedures, and infrastructure designed to deal with a Cold War threat — many of which are at least a decade out of date and far behind the private sector, which

restructured and revitalized, is now competing strongly in a dynamic global marketplace.

Our technological advantage is quickly lost unless we keep at least two steps — and several technological generations — ahead of the enemy. This requires us to reduce cycle times in the development, procurement, and updating of new and modified weapon systems. In order to meet the demands for such vastly reduced cycle times, we determined that we needed to abandon traditional methods of acquiring advanced technology. We must accelerate, broaden, and institutionalize our acquisition reform — thus shifting resources from infrastructure and support to combat and more effective modernization. This deals with the Business Revolution in its broadest context: from competitive sourcing of all work that is not inherently governmental; to privatization of housing; and, of course, continuation and full implementation of the weapons acquisition reforms begun and expanded over the last few years. If we are to produce affordable systems quickly (which is required to keep up with the new technology cycles), we clearly must pursue nontraditional approaches; such as maximum use of commercial equipment, as well as significant design process changes, and (in the production area), use of integrated — commercial and military — assembly lines for defense-unique items, taking maximum advantage of the potential offered by flexible manufacturing and "lean" design and production techniques.

Clearly, many — if not most — of our future conflicts will require ground forces. But, in general, our approach will be to replace massed forces with massed firepower, precisely placed on targets. Our reaction to new forms of aggression must be swift and decisive. The first few days, if not the first few hours, can easily determine the outcome. Our response must come within hours, with sustainability in place in days — not in weeks or months. Such responsiveness requires a significant change in doctrine, tactics, organization, equipment, and, particularly, decision making — a task made far more

challenging in a coalition environment. Each of the Services and each of the CINCs [Commanders in Chief] are now going through such transformations.

Just a few years ago, performance was our benchmark for developing new weapons systems; today, it is performance at affordable cost — specifically, at a cost that will allow us to obtain the quantities required. Today, "cost" is a requirement that must be considered at every stage of our acquisition process — while still continuing to enhance weapons' performance.

We know we must look across the spectrum in our decision-making process. The Army has developed a simulation-based acquisition system known as "SMART" — Simulation and Modeling for Acquisition, Requirements, and Training. The vision for SMART is a process that capitalizes on modeling and simulation [M&S] tools and technology to build high-quality weapon systems and equipment in a cost-effective and efficient manner.

The Crusader program is currently in development and provides a good example of SMART application and the benefits that result. This howitzer and its resupply vehicle will give the Army, for the first time in decades, a system for providing close artillery fires that match and exceed the capabilities of potential enemies. Crusader will be the premier cannon system in the world, with significantly enhanced mobility, range, rate of fire, and survivability. Using the virtual prototype, a physical interference with the two automatic munitions loading arms was discovered. Engineers were able to redesign the prototype and verify that a single arm loader resolved the interference problem and still met weapon system specifications and criteria. This design flaw would have been costly to the program had it not been discovered and resolved early, before the system went into production.

The leadership of the Department of the Navy signed out its first ever DoN Business Vision and Goals [BVG] in July of 1999. The Navy Revolution in Business

Affairs is a broad business vision, a set of business goals, and a series of initiatives focused on moving toward that vision. There are many ongoing programs and initiatives that fit into the business vision. The Navy's SMART WORK Program is committed to improving the quality of the work environment. It focuses on the fact that people are our most important asset. We are therefore funding many SMART WORK initiatives focused on achieving efficiencies and relieving our personnel of burdensome or unnecessary work: advanced paint coatings and contractor preservation teams to more effectively and efficiently maintain our ships; automating fuel fill control systems to reduce oil spills; and other initiatives to reduce repetitive maintenance for our personnel. The Navy is also instituting an Enterprise Resource Planning system, which will allow the entering of financial and inventory information just once. It will permit everyone from the Secretary of the Navy to the youngest seaman recruit to work from a common database. Last year, Congress designated the Department of the Navy as the executive agent for implementing SmartCard throughout DoD. They have already issued a SmartCard to every recruit at Great Lakes boot camp, and by this summer should have SmartCard installed on four battle groups and amphibious readiness groups.

Our defense industrial base has undergone necessary consolidation; and we, in turn, must capitalize on the lessons learned from the successful commercial transformation — how to adopt modern business practices; consolidate and streamline; embrace competitive market strategies; and eliminate or reduce excess support structures. Our future direction must include greater competition; greater civilian/military integration; and strengthened global links in order to achieve the full potential of our defense industrial base.

Unfortunately, potential adversaries are able to rapidly capitalize on modern technology, for example: commercial communications/navigation/earth surveillance satellites, low-cost biological/chemical weapons, cruise and bal-

listic missiles, etc. If they can't develop them, they can purchase them — and the skills to use them — on the world arms market. Therefore, we must develop effective countermeasures to this technology; for example: information warfare defenses, vaccines, and special medical agents to counter biological and chemical weapons, defenses against ballistic and cruise missiles, and the ability to destroy hard and deeply buried targets. In some respects, we have become the victims of our own technological advances. Our successes in using new technology to our advantage in operations such as Desert Storm and Bosnia have made those technologies an object for acquisition by all.

Yet we have no choice. We must develop the defenses, and we must do so in a coalition context. For example, ballistic missile defense — essentially hitting a bullet with a bullet — poses a particularly difficult challenge; and deploying an integrated coalition theater missile defense system — one that collectively hits all the incoming missiles instead of all of us going for the first one coming at us — is an even more demanding technical and management problem. Unless all systems — weapons communications and command and control — are fully interoperable, the complex job of theater missile defense cannot be effectively achieved.

In addition to developing and deploying countermeasures to our adversaries' use of advanced technology (weapons of mass destruction, information warfare, etc.), perhaps the most important implication of the revolution in technology and its global spread is the need for the acceleration of advances in technology in order to maintain superiority on the battlefield.

Research and Development Goals

From a Research and Development perspective, to accomplish this we must ensure that the warfighters today and tomorrow have superior and affordable technology to support their missions, and to give them revolutionary war-winning capabilities. Our number one acquisition priority is providing the

weapons and equipment our combat forces and our allies will need to meet our strategic objectives in 2010 and beyond. One of the difficulties is that we must always be looking with one eye to the day ahead and another eye to the distant future — 10 or 20 years down the line. What do we need to serve the warfighter in 2010 and ensure our national security well into the 21st century? There are five weapons-oriented goals we are working to address:

- First, in the information area, to achieve an interoperable, integrated, secure, and "smart" command, control, communications, computer, intelligence, surveillance, and reconnaissance [C4ISR] infrastructure that encompasses both strategic and tactical needs.
- Second, in the "strike" area, to develop and deploy — in sufficient quantities — long-range, all-weather, low-cost, precise, and "brilliant" weapons for both offensive and defensive use.
- Third, to achieve rapid force projection, global reach, and greater mobility for our forces. With uncertainty over where they will be required, and the need for extremely rapid response to a crisis anywhere in the world, this capability — when combined with the first two elements — will provide us with overwhelming military superiority.
- Fourth, to develop and deploy credible deterrents and, if necessary, military defense against projected, less traditional early 21st century threats, which include: biological, chemical, and nuclear weapons; urban combat; information warfare; and large numbers of relatively low-cost ballistic and cruise missiles. These threats represent priority issues for our resources — even if it means impacting some of our more traditional areas.
- Fifth and finally, to achieve not only inter-Service jointness, but also interoperability with our allies. This is essential for coalition warfare and even more important given the realization that coalition-driven operations will become the norm, rather than the exception, in the future. We must ensure that our allies' technologies complement those of our overall forces. To accomplish our goal of information

Our defense industrial base has undergone necessary consolidation; and we, in turn, must capitalize on the lessons learned from the successful commercial transformation — how to adopt modern business practices; consolidate and streamline; embrace competitive market strategies; and eliminate or reduce excess support structures.

superiority, we are taking steps to make certain that the C4ISR systems and advanced weapons — such as theater missile defense systems — of ourselves and our allies are fully interoperable.

COGNITIVE READINESS

To achieve the capabilities outlined in *Joint Vision 2010*, our Armed Forces will rely on superior learning technologies that must be available on demand, anytime, anywhere. It is known that the complexity, tempo, and dispersion of current military operations stresses traditional training and education systems based in the classroom (synchronous learning). In addition, time spent in on-site education and training impacts operational readiness. The pace of technological change in weapons systems and complex cognitive demands of the variety of missions, including missions-other-than-war, further complicate this concern. Development of new learning technologies to address these concerns and provide cost-effective systems will provide high-quality, "learner-centric" systems for military training and edu-

cation under the Department's overall Advanced Distributed Learning program.

Learner-centric systems require technologies for both synchronous and asynchronous learning, requiring that we undertake technology development through focused research investments in human factors, cognitive task assessment, learning object modules, adaptive learning, intelligent tutors, information network design, knowledge agent development, advanced distributed learning standards, embedded training, and modeling and simulation-based collaborative tools.

TECHNOLOGY ENABLERS

"Technology Enablers" are vital to the success of the Department's RDT&E programs. While they do not fit neatly into any particular technology compartmentalization scheme, they are nevertheless critical to the success of individual and collective S&T programs. Examples of such enablers would certainly have to include the Department's High Performance Computing Modernization Program and our Modeling and Simulation program. The Department recognizes the tremendous impact of these technologies in the development, maturation, and evaluation of our existing and future warfighting technologies. Over the last several years, the Department has developed a world-class computational and modeling infrastructure supporting over 5,000 scientists and engineers working on some of our most challenging technical and developmental problems. The Airborne Laser, the design of the Navy's DD-21, global ocean modeling, THAAD and other ballistic missile defense issues, and Automated Target Recognition are just a few of the projects. The progress we have made in these areas and a great host of others would simply not be affordable, or even achievable, without these technology enablers, and we encourage your continued support in the FY 2001 budget for our efforts.

CIVIL AND MILITARY TECHNOLOGIES MERGING

As is apparent, warfighter systems and defense doctrines are constantly evol-

ing to new dimensions. Many of the DoD science and technology achievements, designed to maintain a technologically superior military force, have progressed to the civilian economy and formed the basis of technological advancement in industry. Today, there is much movement of technology in the other direction, from the commercial world to defense. Historically, there had been a distinct difference between the technologies of warfare (gunpowder, cannons, and bombs) and those of the normal day-to-day commercial economy. As defense has moved increasingly toward information-based warfare, however, and as the information age has moved the civilian economy into the high-tech environment, there has been a growing merger of the technologies of the two arenas.

Common technologies, however, are not enough to yield dual-use operations; there are other areas of concern. The commercial sector frequently offers lower-cost, higher-quality, faster new product realization times and state-of-the-art performance and equipment that meet environmental requirements that

are at least as rigid as those of the military. The Department has three programs in particular—the Domestic Technology Transfer program, the Commercial Operations and Support Savings Initiative (COSSI), and the Dual Use Science and Technology program—which foster this innovative environment.

DOMESTIC TECHNOLOGY TRANSFER PROGRAM

The DoD Domestic Technology Transfer Program encompasses a wide range of activities involving spin-on, spin-off, and dual use. One technology transfer instrument especially important is the Cooperative Research and Development Agreement [CRADA]. While this instrument was designed to transfer federally developed technology to enhance the economic competitiveness of private industry, we have found CRADAs to be a viable method for the DoD laboratories to jointly develop technology with industry, universities, and state and local governments. Both DoD and the non-Federal partners may contribute personnel, services, and property in support of CRADAs, but all direct funding is provided by the non-

Federal entities. The flexibility of this instrument is unparalleled—we have 1,751 active CRADAs—up from 1,364 a year ago. We are doing research in a wide range of technology areas, including vaccine technology, hazardous materials management systems, software development, acoustics and signal processing, imaging technology, and laser development. One project completed this year via CRADA is a forced air de-icing system. It uses a patented nozzle that shoots a 700-mile-per-hour air stream injected with de-icing fluid to remove ice and snow from aircraft surfaces. This system uses 30-50 percent less fluid than current de-icing systems and can de-ice a plane in a fraction of the time it takes with fluid alone. Both American Airlines and the Air Force have ordered this forced air de-icing system. Both the commercial and military sectors will save resources by reducing flight delays and costs associated with the de-icing process.

COMMERCIAL OPERATIONS AND SUPPORT SAVINGS INITIATIVE

Many DoD systems are being retained far beyond what was initially anticipated

SECTION 912C WORKING GROUP COMPLETES FINAL REPORT

The Section 912c Working Group, chartered by the Office of the Secretary of Defense (OSD) in 1998, has completed its Final Report on the "Future Acquisition and Technology Workforce." Dated April 2000, the Report is the culmination of a series of studies conducted by OSD and the Components to support initiatives described in Section 912(c) of the National Defense Authorization Act (NDAA) for Fiscal Year 1998. The 1998 NDAA directed that the Secretary of Defense submit to Congress an implementation plan to streamline the acquisition organizations, workforce, and infrastructure.

The Director, Systems Acquisition, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]) was tasked to chair a Senior Steering Group and to establish a working group to describe the performance characteristics and training requirements of a future acquisition and technology workforce. The group was also directed to outline action plans and the requisite documentation, legislation, and other tools to support career paths for transitioning from today's workforce to the DoD acquisition and technology workforce of the 21st century. The Senior Steering Group and the Working Group membership included representatives from OSD staff, the Military Departments, and the Defense Agencies.

The Final Report recommends measures that will allow DoD to realize a vision of a future acquisition and technology workforce that will be smaller, highly talented and motivated, adaptable, knowledgeable of commercial business practices and information technology, and able to operate in a dynamic, rapidly changing environment. Recommendations were developed

in three major categories: Competencies, Developing the Workforce, and Hiring and Recruitment.

The Final Report recommended the following actions be initiated as soon as possible.

—The Deputy Under Secretary of Defense (Acquisition Reform) (DUSD[AR]) and the Deputy Assistant Secretary of Defense for Civilian Personnel Policy (DASD[CPP]) should begin the examination of the recommended hiring and retirement initiatives and develop implementation plans for those that are approved. They should also prepare proposals for statutory changes for submission in the earliest possible legislative cycle.

—The DUSD[AR] and the DASD[CPP] should determine strategy for incorporating universal competencies in acquisition and technology professional development programs and submit an implementation plan by July 2000.

—The Overarching Acquisition Integrated Product Team and Functional Integrated Product Teams should compare future functional competencies created in this study with current competencies, determine the required adjustments, and prepare an implementation plan by July 2000. They should conduct a progress review with a senior steering group appointed by the USD[AT&L] as soon as possible and every 60 days thereafter until implementation is completed.

Editor's Note: To read the Group's entire report, visit <http://www.acq.osd.mil/ar/#sat1> on the Defense Acquisition Reform Web site.

and, as equipment ages, operations and support [O&S] costs increase. The Commercial Operations and Support Savings Initiative [COSSI] addresses increasing O&S costs by adapting available commercial technologies for use in military equipment. These technology insertions reduce O&S costs by replacing high-maintenance components with ones that are more reliable, less expensive to buy, and able to be upgraded more easily. For example, one project selected in FY 2000 will provide an electronic propeller control system for P-3 aircraft that will reduce propeller maintenance costs from \$26 per flight hour to less than \$4 per flight hour. COSSI currently supports 57 projects. The President's Budget requests \$51.9 million for COSSI projects in FY 2001. This investment is essential if we are going to get O&S costs under control and keep our legacy systems operating at peak performance.

DUAL USE SCIENCE AND TECHNOLOGY PROGRAM

The Department's Dual Use Science & Technology Program allows the DoD and contractors to form partnerships for the purpose of developing technologies that can benefit both parties. A primary Program objective is to help the Department meet future defense requirements by leveraging the technological advances taking place in the commercial marketplace. The Program is meeting that objective. Since the Program began in 1997, the Department has initiated over 200 projects with industry. Over half of the approximately \$800 million being spent on these projects has come from industry. In addition, more and more nontraditional suppliers are starting to participate in the Dual Use S&T Program. However, the real measure of success for the Program is how well it is doing in making the development of dual use technology into a normal way of doing business in the Services. Once again, it is working. The Services are increasingly using cooperative development approaches outside the Program as well as inside. For example, the Army's Communications and Electronics Command is initiating six dual use projects this year. Three have received funding from the Dual Use S&T Program, and three are

being funded outside of the Program. The other Services and Commands are showing similar progress. The President's Budget for FY 2001 requests \$30.4 million for the Dual Use S&T Program. This funding represents that which is required to maintain our momentum and reach our ultimate objective of making dual use technology development a normal way of doing business in the Services.

MANUFACTURING TECHNOLOGY/INDUSTRY

To implement the DoD's Revolution in Business Affairs, we must take full advantage of the technologies and management lessons that have turned around American commerce and industry during the past decade. This means designing and building affordable systems and, simultaneously, cutting support and infrastructure costs. While continuing to explore long-term qualitative leaps forward in military technology, we must also lead the way in low-cost, advanced technology. Affordability is just as great a technical challenge as performance.

The DoD can achieve lower costs, improved performance, and reduced cycle time. Our efforts are resulting in increased combat readiness, better equipment, faster deployment, and overall superiority for the United States military. For example the Manufacturing Technology, or "MAN-TECH" program, focuses on the needs of weapon system programs for affordable, low-risk development and production, providing the crucial link between technology invention, development, and industrial applications. MAN-TECH is one of our key-stone affordability programs, developing the process technology to make defense weapons and material better, faster, and cheaper. Our MAN-TECH request for FY 2001 is \$149 million, up from the FY 2000 request of \$133 million.

For example, the Army, Defense Logistics Agency, and American Metal casting Consortium invented a metal casting process that enables DoD agencies and suppliers to harness the benefits of metal casting with streamlined weapon systems part design. We use blanket purchase agreements with pre-qualified

foundries and improved communications between suppliers and users. Over \$4 million in annual life cycle savings is projected as a result of cycle time reductions and reduced parts count generated from redesign of various weapon systems components into casting assemblies, including the M1 tank, 120mm mortar, F-22 Raptor, lightweight howitzer, and other support equipment across the military services. We were honored to present this team the Hammer Award in 1999. While MAN-TECH is focused on developing improved technologies for Defense applications, transition to commercial products frequently occurs. The Navy's Advanced Fiber Placement program, developed in the early to mid-1990s, is now receiving widespread industrial-base application. This technology provides a state-of-the-art, automated machining process for composite material, replacing a more costly and less reliable touch labor process. Following initial implementation by Boeing and Northrop Grumman on F/A-18E/F stabilator, engine inlet ducts, and fuselage, technology application was expanded to include the V-22 Osprey fuselage skin, C-17 landing gear pod fairings, T-45 horizontal stabilator, and AH-1 helicopter main rotor spars and cuffs. Commercial applications include the Boeing helicopter 609, Boeing 777, and Raytheon Premier components. Over 14 fiber placement machines, valued at \$37 million, have been sold to several prime aerospace contractors.

Conclusion

Mr. Chairman, we wish to thank the Committee for this opportunity to give you a broad overview of our defense research and development posture. The future of our modernization efforts will rely on the partnerships we form in the development and execution of our R&D programs, which in turn will enable tomorrow's warfighting superiority. The Congress and the Department have worked hard—together—to achieve our global dominance and to maintain our strength. We urge your continued support of our common, overriding interest in keeping our combat forces the best equipped, the best supplied, and the best sustained in the world.



Selected Acquisition Reports

As of December 1999

The Department of Defense has announced cost and schedule changes on major defense acquisition programs based on the Selected Acquisition Reports (SAR) submitted to the Congress to cover the period from October to December 1999.

SARs summarize the latest estimates of cost, schedule, and technical status. These reports are prepared annually in conjunction with the President's budget. Subsequent quarterly exception reports are required only for those programs experiencing unit cost increases of at least 15 percent or schedule delays of at least six months. Quarterly SARs are also submitted for initial reports, final reports, and for programs that are rebaselined at major milestone decisions.

The total program cost estimates provided in the SARs include research and development, procurement, military construction, and acquisition-related operation

and maintenance. Total program costs reflect actual costs to date as well as anticipated costs for future efforts. All estimates include allowances for anticipated inflation.

The current estimate of program acquisition costs for programs covered by SARs for the prior reporting period (ending in September 1999) was \$710,149.4 million. After subtracting the costs for a final report (Sensor Fuzed Weapon (SFW) and adding the costs for a new program (Advanced Extremely High Frequency [AEHF] Satellite) plus one new component of an existing SAR (Space Based Infrared System [SBIRS] -Low) in September 1999, the adjusted current estimate of program acquisition costs was \$715,142.3 million. There was a net cost change of +\$21,685.0 million during the current reporting period (December 1999). The cost changes between September and December 1999 are summarized below:

	Current Estimate (\$ in Millions)
September 1999 (72 programs*)	\$710,149.4
Less final report on completed program (SFW)	
Plus one new program, NTW (Navy Theater Wide)	-1920.9
Plus one new program (AEHF) and one new component of an existing SAR (SBIRS Low)	+6,913.8
September 1999 Adjusted (72 programs*)	\$715,142.3

*Excludes classified costs for the Air Force's MILSTAR program.

Changes Since Last Report

Economic	-\$5,379.1
Quantity	+2,117.0
Schedule	+3,086.2
Engineering	+4,493.7
Estimating	+16,926.2
Other	+502.8
Support	-61.8
Net Cost Change	+21,685.0
Plus initial procurement and construction cost estimates for National Missile Defense (NMD); previous reports were limited to development costs per Title 10, Section 2342, United States Code	+5,517.6
December 1999 (73 programs*)	\$742,344.9

For the December 1999 reporting period, there was a net cost change of +\$21,685.0 million or +3.0 percent. This increase was primarily due to higher program estimates (+\$16,926.2 million), additional engineering changes (hardware/software) (+\$4,493.7 million), and a net stretch-out of the development and procurement schedules (+\$3,086.2 million). There was also a net increase in the planned quantities to be purchased (+\$2,117.0 million). These overall increases were partially offset by the application of lower escalation indices (-\$5,379.1 million).

New SARs (As of Dec. 31, 1999)

The Department of Defense has submitted initial SARs for FBCB2 and IAV. These reports do not represent cost growth. Baselines established on these programs will be the point from which future changes will be measured. The current cost estimates are provided below:

Current Estimate

(\$ in Millions)

FBCB2 (Force XXI Battle Command Brigade & Below)	\$2,574.4
IAV (Interim Armored Vehicles)**	+352.5
Total	\$2,926.9

**Excludes classified costs for the Air Force's MILSTAR program.*

***Pre-Milestone II program reporting development (RDT&E) costs only, in accordance with the provisions of Section 2432, Title 10, United States Code.*

Summary Explanations of Significant SAR Cost Changes (As of Dec. 31, 1999)

ABRAMS UPGRADE – Program costs increased \$1,883.7 million from \$8,092.6 to \$9,976.3 million (+23.3 percent), due primarily to the addition of the System Enhancement Package (SEP) to the M1A2 program (+\$1,982.4 million). Previously, the SEP program was budgeted separately from the M1A2 program. Additionally, a shift from the Embedded Battle Command to the Integrated Combat Command and Control for the implementation of Army Digitization resulted in an increase of \$136.3 million. These increases were partially offset by costs relating to a reduction in facilities which resulted in savings of \$247.1 million.

ATIRCM/CMWS (Advanced Threat Infrared Countermeasures/Common Missile Warning System) – Program costs decreased \$300.6 million from \$2,966.3 to \$2,665.7 million (-10.1 percent), due primarily to a reduction in Air Force quantities of 491

units from 853 to 362 units (-\$352.0 million) and a reduction in Navy quantities of 401 units from 665 to 264 units (-\$324.4 million). These decreases were partially offset by an increase in the unit costs for the remaining Army and Navy units due to the production rate effects associated with the aforementioned quantity decreases (+\$403.8 million).

CHEM DEMIL (Chemical Demilitarization) – Program costs decreased \$1,403.3 million (-9.6 percent) from \$14,586.9 million to \$13,183.6 million, due primarily to the realignment of funds from the Pueblo Chemical Agent Disposal Facility and the Blue Grass Chemical Agent Disposal Facility to the Assembled Chemical Weapons Assessment (ACWA) program, which is planned to demonstrate alternatives to the baseline incineration process of destruction of assembled chemical weapons.

CRUSADER (Artillery System) – Development costs increased \$1,397.3 million from \$2,905.0 million to \$4,302.3 million (+48.1 percent), due primarily to the restructure of the program to align itself with the Army's vision for more deployable forces (+\$955.7 million). Additionally, the program schedule was stretched to adjust for software delays (+\$492.5 million).

MCS (Maneuver Control System) – Program cost increased \$407.9 million (+24.7 percent) from \$1,648.1 million to \$2,056.0 million, due primarily to a change in Army policy on MCS computer replacement requirements. MCS is to be replaced every 10 years rather than 20 years, and the responsibility for procurement of the rebuy was transferred from operation and maintenance funding to MCS procurement funding (+\$354.6 million).

SADARM (Search and Destroy Armor) – Program costs decreased \$1,830.2 million (-71.2 percent) from \$2,570.1 million to \$739.9 million, due primarily to a quantity reduction of 48,937 munitions from 50,000 to 1,063 munitions (-\$953.9 million) and associated schedule and estimating allocations* (-\$1,068.7 million).

AAAV (Advanced Amphibious Assault Vehicle) – Development costs increased \$108.4 million (+11.6 percent) from \$934.1 million to \$1,042.5 million, due primarily to an increase of two Program Definition & Risk Reduction (PDRR) prototypes from one to three prototypes, and associated engineering, test, and support requirements. There were also increases related to additional Command, Control, Communications, and Intelligence (C4I) variant requirements, AAAV survivability, and upgrades to the 30mm cannon.

CH-60S (Utility Helicopter) – Program costs increased \$1,147.0 million (+36.0 percent) from \$3,185.8 million to \$4,332.8 million, due primarily to a quantity increase of 72 aircraft from 165 to 237 aircraft (+\$1,299.9 million) and the addition of Airborne Mine Countermeasures sensors (+\$94.3 million). The increase was partially offset by a decrease associated with production rate effects from the addition of the 72 aircraft (-\$235.8 million).

DD 21 (21st Century Destroyer) – Development costs increased \$2,028.4 million (+63.6 percent) from

\$3,191.1 million to \$5,219.5 million, due to higher development cost estimates for initial system design (+\$1,404.6 million) and additional ship capabilities, including Integrated Electric Drive, Volume Search Radar and Advanced Gun System (+\$650.3 million).

DDG 51 (Guided Missile Destroyer) – Program costs increased \$1,842.4 million (+3.4 percent) from \$53,965.2 million to \$55,807.6 million, due primarily to a quantity increase of 1 ship from 57 to 58 ships (+\$983.7 million), plus revised cost estimates for ship construction, government furnished equipment, and outfitting and post delivery (+\$837.3 million).

LHD 1 (Amphibious Assault Ship) – Program costs increased \$2,426.3 million (+31.0 percent) from \$7,826.3 million to \$10,252.6 million, due primarily to a quantity increase of 1 ship from 7 to 8 ships, plus outfitting and post delivery costs associated with the additional ship.

SH-60R (Multi-Mission Helicopter) – Program costs increased by \$860.2 million (+17.3 percent) from \$4,963.7 million to \$5,823.9 million, due primarily to a quantity increase of 56 units from 185 to 241 units (+\$952.5 million). This increase was partially offset by a quantity decrease of 1 fully configured test article from 3 to 2 units (-\$18.2 million).

T45TS (Jet Pilot Training System) – Program costs decreased by \$1,628.6 million (-23.7 percent) from \$6,870.7 million to \$5,242.1 million, due primarily to a quantity decrease of 65 aircraft from 234 to 169 aircraft (-\$1,330.7 million) and a decrease in the amount of required weapons support due to the quantity decrease (-\$330.2 million).

V-22 (Vertical Lift Aircraft) – Program costs increased \$1,891.9 million (+5.1%) from \$36,220.3 million to \$38,112.2 million, due primarily to revised labor rates and material costs (+\$2,305.5 million). This increase was partially offset by the application of revised escalation indices (\$243.8 million) and a change in initial spares requirements (-\$232.6 million).

ABSTRACT

ABL (Airborne Laser) – Development costs increased \$831.6 million (+30.6 percent) from \$2,713.9 million to \$3,545.5 million, due primarily to restructuring of the Program Definition and Risk Reduction (PDDR) phase (+\$875.2 million). This restructuring of the de-

velopment program results in a two-year delay in the lethality demonstration (from FY 2003 to FY 2005), while the delay in beginning the Engineering and Manufacturing Development (EMD) phase is to be determined. The increase was partially offset by revised escalation indices (-\$19.7 million) and execution and Congressional adjustments (-\$27.0 million).

AEHF (Advanced Extremely High Frequency) Satellite — Development costs decreased \$304.7 million (-11.3 percent) from \$2,690.6 million to \$2,385.9 million. Since this is a pre-Milestone II program, the SAR reflects only development funding. The cost decrease is due primarily to the application of revised escalation indices (-\$23.2 million), and the differing mix of development and procurement funding between the Service Cost Position and the FY 2001 President's Budget (-\$287.0 million). This mix will be addressed at Milestone II/Milestone III, scheduled for February 2001.

B-1 CMUP (Conventional Mission Upgrade Program) — Program costs increased \$201.8 million (+9.3 percent) from \$2,162.7 million to \$2,364.5 million, due primarily to the restructuring of the Defensive Systems Upgrade (DSUP) portion of the program. Specifically, there were delays in GFE deliveries from the Navy's Integrated Defensive Electronic Countermeasures (IDECM) program, which include a techniques generator and a fiber optic towed decoy. The DSUP Engineering and Manufacturing Development (EMD) program will be stretched 14 months, and the production program will be delayed until FY 2004. The cost of the additional 14 months of EMD as well as cost increases in GFE and installation resulted in Nunn-McCurdy unit cost breaches of 39 percent to the Program Acquisition Unit Cost and 50 percent to the Average Procurement Unit Cost.

GBS (Global Broadcast Service) — Program costs increased \$67.4 million (+14.7 percent) from \$457.7 million to \$525.1 million, due primarily to rephasing the Army procurement for receive suites (+\$27.3 million) and a net increase of 31 receive suites and Theater Injection Points (TIPs) from 272 to 304 (+\$30.6 million), which were offset by associated schedule and estimating allocations* (-\$14.6 million). There were also increases related to a refinement of the estimate for transponder lease and support activities (+\$23.0 million).

NAS (National Airspace System) — Program costs increased \$217.4 million (+27.6 percent) from \$787.1 million to \$1,004.5 million, due primarily to a quantity increase of 12 operational suites from 53 to 65 suites (+\$99.8 million) and changes required to site-specific configurations (+\$114.5 million).

NAVSTAR GPS (Global Positioning System)/Satellite Portion — Program costs increased \$1,398.1 million (+13.8%) from \$10,151.4 million to \$11,549.5 million, due primarily to the addition of development and procurement funding for the GPS modernization program (+\$1,119.0 million), and a revised estimate for the operational control system based on a better understanding of the complexity of effort (+\$236.4 million).

NMD (National Missile Defense) — Development program costs increased \$3,153.1 million (+35.8 percent) from \$8,808.4 million to \$11,961.5 million, due primarily to increased system capability, which includes additional weapons for flight tests and additional production facility capability to handle increased missile quantity requirements (+\$822.4 million), additional weapon system sustaining engineering, production verification testing, system-level sustaining engineering, and program management attributable to additional quantities and expanded delivery schedule (+\$1,175.5 million), added test infrastructure requirements and additional flight tests to support the expanded capability (+\$734.0 million), cost growth because government furnished assets were less mature than the Lead System Integrator contractor had anticipated (+\$407.0 million), additional ground-based X-Band radar hardware and software design requirements (+\$91.0 million), upgraded battle management command, control and communications (+\$47.2 million). These increases were partially offset by the application of revised development escalation indices (-\$21.1 million) and a revised cost estimate (-\$97.4 million).

As a result of the Department's approval of the Deployment Readiness Review Criteria and Single Acquisition Management Plan in June 1999, \$5,035.0 million of procurement and \$482.6 million of military construction (MILCON) have been added to the SAR. Previously, the NMD SAR was limited to development costs only (per Title 10, Section 2432, United States Code).

A subsequent Defense Acquisition Executive decision resulted in the expansion of the NMD program. The program has been revised to an "Expanded Capability 1." There were procurement cost increases associated with an increase of 80 deployed missiles (from 20 to 100) (+\$1,507.1 million), Ground Based X-Band Radar component quantity increases to support control of increased number of engagements (+\$494.0 million), an increase in production support (+\$484.2 million), and additional program management and award fee resulting from expanded system capability (+\$382.6 million). These increases were partially offset by a revision in procurement and MILCON escalation indices (-\$41.9 million), a revised estimate for initial spares (-\$41.6 million), and a rephase of annual missile procurements (-\$20.9 million). Total program costs are now estimated at \$20,252.2 million.

NTW TBMD (Navy Theater Wide Theater Ballistic Missile Defense) – Development costs increased \$589.8 million (+13.2 percent) from \$4,464.3 million to \$5,054.1 million, due primarily to additional scope that was incorporated as part of the evolutionary acquisition strategy (+\$611.7 million). That is, the Department's guidance on Upper Tier programs directed the Navy to continue the evolutionary block approach, through the initial system flight test program, followed by three developmental increments of the Block I system (First Unit Equipped for NTW Block IA in FY 2006, Block IB in FY 2008, and Block IC in FY 2010). The existing NTW budget provides for completion of AEGIS Lightweight Exo-Atmospheric Projectile Intercept (ALI) flight demonstration through FY 2002 and minimally sustains industrial base capability through FY 2005. This aforementioned cost increase was partially offset by the application of revised escalation indices (-\$24.8 million).

PATRIOT PAC-3 (Patriot Advanced Capability) – Program costs in the previous SAR were \$7,775.8 million, and only one end-item, a Fire Unit, was shown. This SAR splits the program into two end-items, Fire Unit and Missile Segment. The \$7,775.8 million in the previous SAR was comprised of \$2,866.7 million for Fire Unit and \$4,909.1 million for Missile Segment. For this SAR, Fire Unit costs increased \$101.9 million (+3.6 percent) from \$2,866.7 million to \$2,968.6 million, due primarily to a revised estimate for Reliability, Availability, and Maintainability (RAM) modifications (+\$93.5 million), and an increase in

Army modification spares funding (+\$9.4 million). These increases were partially offset by the application of revised escalation indices (-\$2.3 million). Missile Segment costs increased \$2,262.2 million (+46.1 percent) from \$4,909.1 million to \$7,171.3 million, due primarily to an increase of 452 missiles from 560 to 1,012 missiles (+\$1,141.0 million) and associated schedule, engineering, and estimating allocations* (+\$443.2 million), a stretch-out of annual procurement buy profile (+\$640.5 million), additional funding to cover EMD cost growth (+\$50.0 million), and a congressional supplemental to restore Procurement funding from a FY 1999 reprogramming action (+\$45.0 million). These increases were partially offset by the application of revised escalation indices (\$23.2 million).

THAAD (Theater High Altitude Area Defense) – Development costs increased \$897.8 million (+10.3 percent) from \$8,692.8 million to \$9,590.6 million, due primarily to revised estimating methodology to reflect an increase in fee structure to sufficiently cover the EMD contract, and additional revisions to the engineering development estimates (+\$417.8 million). There were also increases related to an engineering effort to incorporate cost reduction initiatives into missile design (+\$408.0 million), 15 additional flight tests to incorporate lessons-learned and evolutionary development approach (+\$230.2 million), and an extended EMD period of performance (by 22 months) as part of risk-reduction program restructuring (+\$211.8 million). These increases were partially offset due to elimination of use and support of User Evaluation System ground equipment in THAAD test program (-\$331.5 million), and the application of revised escalation indices (-\$42.9 million).

**Quantity changes are estimated based on the original SAR baseline cost-quantity relationship. Cost changes since the original baseline are separately categorized as schedule, engineering, or estimating "allocations." The total impact of a quantity change is the identified "quantity" change plus all associated "allocations."*

Editor's Note: This information is in the public domain at <http://www.defenselink.mil/news>.

Third International Acquisition/Procurement Seminar - Pacific



September 18-21, 2000

**Sponsored jointly by the
Singapore Ministry of Defence
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TOPICS

- **Comparative National Acquisition Practices: Pacific Rim (PACRIM) Nations**
- **National Policies on International Acquisition/Procurement**
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**Singapore Ministry of Defence,
DSMC, New Zealand Ministry of
Defence, ADFA, and KIDA to
Conduct International Seminar**

The Third International Acquisition/Procurement Seminar — Pacific (IAPS-P) focuses on international acquisition practices and cooperative programs. The seminar is sponsored by defense educational and related institutions in Singapore, the United States, New Zealand, Australia, and South Korea.

The seminar will be held Sept. 18-21, at the Regent Hotel, Singapore.

Those eligible to attend are Defense Department/Ministry and defense industry employees from the five sponsoring nations, who are actively engaged in international defense acquisition programs. Other nations may participate by invitation. PACRIM nations participating in previous seminars were Canada, Japan, and Thailand.

The IAPS-P is by invitation only. Those desiring an invitation who have not attended past seminars, should submit a letter of request, on government or business letterhead, to DSMC by fax.

Visit the seminar registration Internet Web site at **<http://www.dsmc.dsm.mil/international/international.htm>** for additional seminar information. *Qualified participants pay a small seminar expenses charge of \$50 per day.* Invitations, confirmations, and joining instructions will be issued after June 1.

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Operational Evaluation of Electromagnetic Environmental Effects (E3)

Editorial Board: Defense Center for Threat Systems for Assessment of E3

MARIO LUCCHESI • DR. C. LESLIE GOLLIDAY JR.
DR. ANIL N. JOGLEKAR

Increased dependence of our military forces on the use of information, electronic, and electromagnetic systems has heightened our nation's awareness of military use of the electromagnetic spectrum. For both defense and non-defense applications, spectrum use is increasing, and market forces are steering national policy makers to reallocate exclusive government/military portions of the spectrum to private use. Further, DoD is increasingly aware that the use of more commercial and military electronic systems in tight spaces aboard military ships, aircraft, and vehicles can cause unintended electromagnetic interactions among these systems; such interactions are likely to have adverse impacts on operations.

The discipline of analyzing and managing friendly, unintended adverse electromagnetic interactions and susceptibilities is called electromagnetic environmental effects or E3. A parallel discipline to E3 is spectrum management or SM. SM is the discipline of managing the use of the electromagnetic spectrum to prevent mutual interference among the users.

Many E3/SM incidents already have occurred that have limited mission effectiveness, destroyed systems, and may even have resulted in friendly casualties. For example, in recent operations in the Balkans, a jammer aircraft experienced an engine shutdown when it began to



UH-60 Black Hawk helicopters from the 3-25 Assault Helicopter Battalion take off from the deck of the aircraft carrier, *USS Eisenhower* (CVN-69), bringing the first wave of combat troops ashore in Haiti, Sept. 19, 1994.

Photo by Navy PH1 Martin Maddock

transmit jamming signals. A remotely piloted vehicle for which a payload of electronics was rapidly configured without regard to E3, experienced interference problems that caused dropouts in the downlink. Our own jammer aircraft interfered with an artillery counter-battery radar. In Macedonia, electronic equipment experienced problems when hooked up to the local power grid. In a test flight over a range in the southwest

United States, a Global Hawk Unmanned Aerial Vehicle (UAV) experienced interference from an adjacent test range that was testing auto-termination transmissions on the same frequency. The result was initiation of the self-destruct mechanism in the UAV; the aircraft was destroyed.

A highly memorable incident occurred during the Vietnam War when an ex-

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Fire broke out on the flight deck of *USS Forrestal* (CV 59) as aircraft were being readied for launch over Vietnam. Damage to aircraft and the ship was severe. The final casualty count was 132 dead, two missing, and 62 injured.

U.S. Navy photo



plosion and resulting fire occurred aboard the aircraft carrier *USS Forrestal*, operating off Vietnam. Stray voltage was thought to be a possible cause. A potential source was one of the ship's radars, which may have ignited a rocket on one of the aircraft waiting to be catapulted. A number of lives and aircraft were lost. A more recent incident was the loading of ordnance on Army attack helicopters aboard the carrier *USS Eisenhower* in 1994. The helicopters aboard the *Eisenhower* were bound for Haiti and intended for use in Operation Uphold Democracy. The Navy was concerned that since the Army helicopter ordnance had not been certified for the carrier's electromagnetic environment, a disaster might occur. The ship's radar could not be used, which limited operations.

Department of Defense (DoD) policies for E3 and SM are prescribed in DoD Regulation 5000.2-R.¹ Department of Defense Directive 3222.3² provides further policy detail on E3, and DoD Directive 4650.1³ provides further policy detail on SM. The two directives are currently in revision. Because of the E3/SM incidents cited earlier, along with others, the Director, Operational Test and Evaluation (DOT&E), Philip E. Coyle III has developed a policy on actions his office will take to reduce E3/SM incidents in the future.⁴

What is E3?

Any clear understanding of E3 and SM should start begin with formal definitions from Joint Pub. 1-02.⁵ E3 is defined as:

The impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility/electromagnetic interference (EMC/EMI); electromagnetic vulnerability (EMV); electromagnetic pulse (EMP); electronic protection (EP); hazards of electromagnetic radiation to personnel (HERP), ordnance (HERO), and volatile materials (HERF); and natural phenomena effects of lightning and p-static (precipitation static).

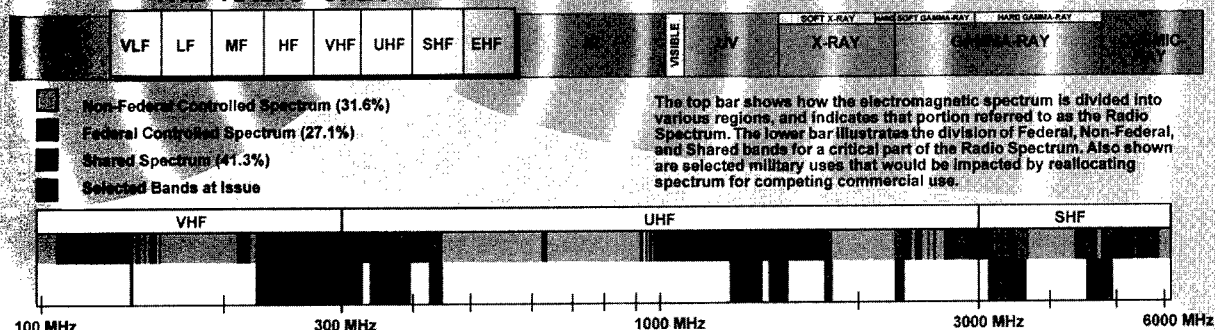
Global Hawk, DoD's newest reconnaissance aircraft, flies over Edwards Air Force Base, Calif., Feb. 28, 1998, during its first flight. Global Hawk is a high-altitude, long-endurance, UAV designed to operate with a range of 13,500 nautical miles, at altitudes up to 65,000 feet, and with an endurance of 40 hours. During a typical reconnaissance mission, the aircraft can fly 3,000 miles to an area of interest, remain on station for 24 hours, survey an area the size of the state of Illinois (40,000 square nautical miles), and then return 3,000 miles to its operating base. Sensors on board the aircraft can provide near real-time imagery of the area of interest to the battlefield commander via worldwide satellite communication links and the system's ground segment.

DoD Photo

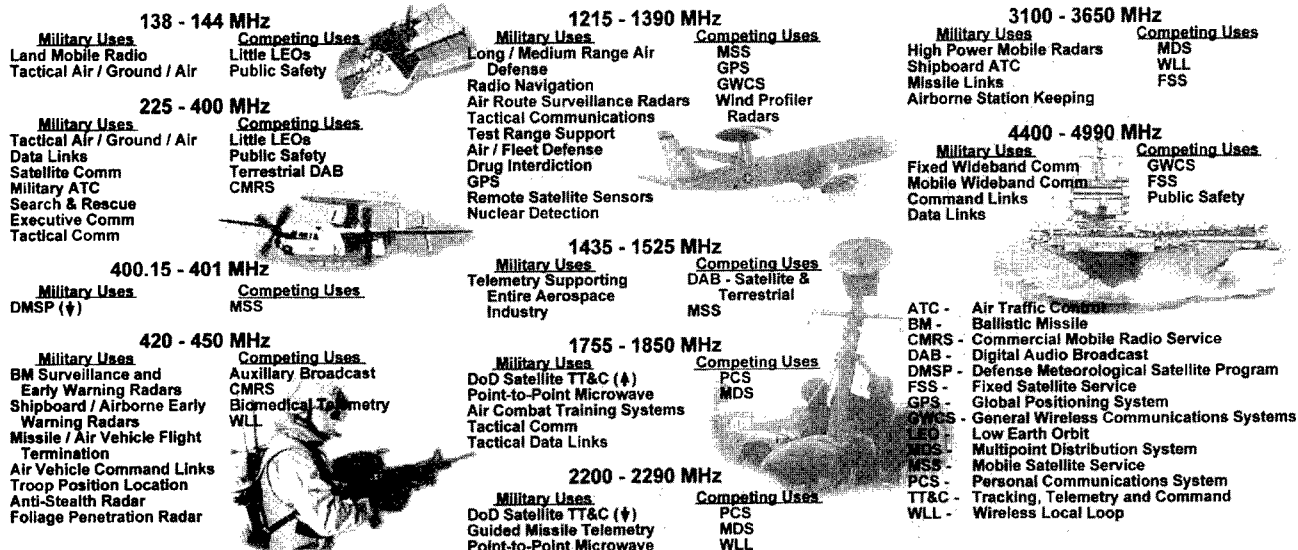


Electromagnetic Spectrum

THE RADIO SPECTRUM



Selected Bands at Issue



Spectrum Management is defined as:

Planning, coordinating, and managing joint use of the electromagnetic spectrum through operational, engineering, and administrative procedures, with the objective of enabling electronic systems to perform their functions in the intended environment without causing or suffering unacceptable interference.

Electromagnetic environmental effects comprise a number of electromagnetic disciplines, as indicated in the definition. The definitions of these disciplines, also defined in Joint Pub. 1-02, are presented in Figure 1.

From the perspective of the developer and the user, spectrum management has

two major components: *spectrum certification* and *frequency assignment*.

SPECTRUM CERTIFICATION

Spectrum certification is of concern to the developer (i.e., the program manager). It is the process (called the J/F-12 process by the spectrum managers) whereby a new spectrum-dependent system is certified to operate in a portion of the spectrum. This is not permission for the user to operate the system—it is permission for the developer to design and build the system to operate in the approved portion of the spectrum.

The vehicle for initiating the spectrum certification process is DD Form 1494.⁶ Updated continuously throughout the acquisition process, this form is filed with the Military Communications-Electronics Board directly or through a local

frequency manager. The J/F-12 process is extremely important because the spectrum is tightly controlled by international agreements whereby portions of the spectrum are allocated for various functions and system spectral characteristics. The approval process consists of the U.S. spectrum managers finding the best "fit" for the new system to minimize potential EMC/EMI with other systems operating in the same or adjacent portions of the spectrum. This process normally involves coordination with international organizations.

To obtain approval (certification) with nations in which the system is intended to operate, the Host Nation Coordination (HNC) section in DD Form 1494 must be completed. Host nation approval is needed because there are vari-

ations in the global table of spectrum allocations, depending on the region of the world (there are three regions). Each sovereign nation controls the spectrum within its borders. A particular function or service, such as cellular telephone service, may be allocated one frequency band in one country and another frequency band in another country. A frequent mistake made by purchasers of commercial equipment (such as a cell phone) in the United States for use overseas is the belief that overseas use of equipment is allowed without proper certification by the host country.

FREQUENCY ASSIGNMENT

The second major component of spectrum management is the frequency assignment process, which gives the user (warfighter) the authority to operate a fielded, spectrum-dependent system. To prevent EMI, coordination among all spectrum users within a frequency band and geographic region must occur. The regional frequency manager provides this coordination. DoD Area Frequency Coordinators are available at the major test ranges in the United States. For overseas operations, frequency management for U.S. forces is handled by the Joint Frequency Management Office of the Commander in Chief or Joint Task Force, working in conjunction with the host nation frequency management authorities.

The seriousness of a military conflict does not necessarily permit U.S. military forces unrestricted use of the spectrum. Local region commerce, public safety, and public service operations are expected to continue, to the extent possible, even in a conflict. This is especially true if the conflict is of limited intensity (e.g., peacekeeping operations), or of limited geographic scope (i.e., the conflict

is in a small nation surrounded by border nations that are not involved in the conflict but are affected by electromagnetic transmissions in the conflict area). The ease with which U.S. forces can gain the necessary authorization from regional governments will generally depend on the extent to which commerce will be disrupted or whether anyone's national sovereignty is actually threatened.

DOT&E's new {E3/SM} policy is intended to make program managers and Operational Test Agencies aware that DOT&E plans to assess this area more systematically. It is not intended to replace or add to any existing DoD directives or regulations, but to ensure that current required practices are applied and leveraged to the fullest extent in evaluations of system operational effectiveness.

From the perspective of the program manager, the importance of E3 and SM in acquisition lies in two areas:

- First, the PM needs to be concerned with obtaining spectrum certification for the new spectrum-dependent system under development. Without this, the system cannot be operated, and thus would be of no use to the warfighter. The J/F-12 process for approval takes time, especially if HNC is needed to operate the system in areas outside of the United States. For this reason, it is important to start the process (filing form DD 1494) early in the acquisition program at, or soon after, Milestone 0.
- Second, E3 needs to be addressed as early as possible because mission ef-

fectiveness and the safety of the warfighter will be adversely affected if these effects are not understood. E3 is complex; program managers and their teams need time to analyze effects and design prevention into the system, or at least accurately document the limitations and vulnerabilities for the warfighter.

Policy Specifics

DOT&E is placing greater emphasis on E3 matters with early involvement in the acquisition process to prevent problems from reaching the field. Certainly, analyzing E3 problems and designing preventative measures in the development phase is more cost effective than being forced to create fixes in the field, especially after becoming aware of the problem only after suffering loss of life and property.

DOT&E's new E3/SM policy more clearly defines the role of Operational Test and Evaluation (OT&E) in identifying potentially adverse E3 and spectrum availability situations. The policy is intended to make pro-

gram managers and Operational Test Agencies aware that DOT&E plans to assess this area more systematically. It is not intended to replace or add to any existing DoD directives or regulations, but to ensure that current required practices are applied and leveraged to the fullest extent in evaluations of system operational effectiveness. Figure 2 lists specific actions to be carried out by the responsible organizations.

Signed on Oct. 25, 1999, the new DOT&E policy applies to all DOT&E oversight programs. It applies to programs at Milestone 0 at the time of approval. Programs between Milestone 0 and Milestone III are to incorporate this approach during their next Test & Evaluation Master Plan approval cycle.

Discipline Definition (Joint Pub. 1-02)

EMC	The ability of systems, equipment, and devices that utilizes the electromagnetic spectrum to operate in their intended operational environments without suffering unacceptable degradation or causing unintentional degradation because of electromagnetic radiation or response. It involves the application of sound electromagnetic spectrum management; system, equipment, and device design configurations that ensure interference-free operation; and clear concepts and doctrines that maximize operational effectiveness.		
EMI	Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like.		
EMV	The characteristics of a system that cause it to suffer a definite degradation (incapable of performing the designated mission) as a result of being subjected to a certain level of electromagnetic environmental effects.		
EMP	The electromagnetic radiation from a nuclear explosion caused by Compton-recoil electrons and photo-		
			electrons from photons scattered in the materials of the nuclear device or in a surrounding medium. The resulting electric and magnetic fields may couple with electrical/electronic systems to produce damaging current and voltage surges (pulses). May also be caused by non-nuclear means.
		EP	That division of electronic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability.
		HERO, HERP, HERF	HERO is the danger of accidental actuation of electro-explosive devices or otherwise electrically activating ordnance because of radio frequency (RF) electromagnetic fields. This unintended actuation could have safety (premature firing) or reliability (dud-ding) consequences. HERP (not specifically defined in Pub. 1-02) refers to the danger of RF electromagnetic fields to the health of personnel. HERF (not specifically defined in Pub. 1-02) refers to the danger of RF electromagnetic fields accidentally igniting volatile materials (fuels).

Organization Actions

DOT&E

- Review Service Test and Evaluation Master Plans (TEMP), System Threat Assessment Reports, Operational Requirements Documents, test plans, test concept briefings, and test reports to determine the adequacy of E3 testing.
- Ensure that E3 issues are satisfactorily reviewed by program acquisition Integrated Product Teams (IPT).
- Review Services' evaluation approaches, including modeling and simulation, small-scale tests, and appropriate chamber and laboratory tests.
- Leverage the evaluation of E3 impacts during large-scale field training exercises.
- Review Services' early assessments to identify and understand those situations where E3 and spectrum limitations would likely affect mission accomplishment. The results and projected impacts should be reviewed in the appropriate IPT forum and used in the design and scoping of full-scale operational tests.
- Review the DD Form 1494 and J/F-12 process and share the data with the OTAs.
- Review E3 engineering assessments and qualification test plans and reports.
- Report the status of E3 issues for each program in the DOT&E Annual Report, and report specific program findings as part of Beyond Low Rate Initial Pro-

Organization Actions

duction reports to the Secretary of Defense and the Congress.

- As E3 issues related to fielded systems arise during operational tests (OT) or during large-scale training exercises used to complement OTs, report these issues to the appropriate agencies for resolution.

OTAs

- Work in conjunction with the Joint Spectrum Center, the Defense Intelligence Agency, the system user, and others as appropriate to conduct early independent analyses of potential E3 issues, and review the program manager's resolution of these issues.
- Conduct early operational assessments that consider the intended operational environment, including storage, training, transportation, staging, and conduct of the battle in single Service, joint, and international deployments. (Avoid relying solely on developer-planned E3 analyses or evaluations.)
- Include E3 and spectrum availability assessment issues as a standard presentation at Operational Test Readiness Reviews. These assessments should include the operational impact of any waivers and results of analyses normally accomplished as part of the DD-1494 or J/F-12 review process.

PMs

- Ensure that E3 test and evaluation receives adequate funding and is sufficiently addressed in system

Implementation

To assist program managers in E3/SM matters concerning their programs, DOT&E, together with the OTAs and with the assistance of the Defense Information Systems Agency Joint Spectrum Center (JSC), is in the process of developing guidance for implementing the policy. A guidance document for program managers is in preparation and will be distributed when available.

DOT&E is following a philosophy of identifying and enabling units to fix E3 and SM problems early in the acquisition program to the maximum extent possible without "breaking the bank" before operational testing and fielding occurs. E3 problems are highly scenario-dependent, and it may not be possible to identify and solve them using the models/simulation, test and evaluation process for all possible scenario configurations. In such cases, the models/simulation, test and evaluation process is intended to document specific limitations and vulnerabilities and inform the

warfighter. Adjustments can then be made in tactics, techniques, and procedures to accommodate the limitations.

The JSC has considerable expertise in E3 and SM matters. This organization can provide advice and carry out E3 test and analyses in the field or in the laboratory. At its disposal are a multitude of Electromagnetic Compatibility databases and models. The JSC can also assist in the completion of DD Form 1494 and provide guidance in the J/F-12 process.

Editor's Note: The point of contact at the JSC is the E3 Engineering Division Chief, Bill Lenzi, at (410) 293-4958 or J5@jsc.mil. Lenzi can also provide an educational video on CD-ROM called "E3 and SC (Spectrum Certification) for Acquisition Managers."

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From DSMC Protégé to MDW Award-Winning Photojournalist



Photo by Collie Johnson

aura Bonner, a former layout artist for *Program Manager* magazine, receives the Keith L. Ware Award for Photojournalism in a ceremony at Fort Belvoir, Va., March 31. Presenting the award is Army Maj. Gen. Robert R. Ivany, Commanding General, U.S. Army Military District of Washington. Bonner came to DSMC in 1998 at the journeyman level under the mentorship of Paula Croisetiere, DSMC Chief of Design. *Program Manager* magazine was Bonner's first assignment upon entering the communications media career field. Currently, she is the designer for the Military District of Washington Pentagongram.

The Keith L. Ware Competition, recognizing journalistic excellence in several categories, is named in memory of Army Maj. Gen. Keith L. Ware, former Army Chief of Public Affairs. Gen. Ware received the Medal of Honor in World War II and was killed while commanding the 1st Infantry Division in Vietnam in 1968.

Program Forges Next Generation Of Civilian DoD Leaders

NAVY JOURNALIST 1ST CLASS MICHAEL J. MERIDITH

OFFUTT AIR FORCE BASE, Neb. (AFPN) — Two years ago, Christine Ott, primary assistant to the U.S. Strategic Command [USSTRATCOM] Executive Director of Operations and Logistics, became one of a handful of Department of Defense [DoD] civilian employees selected for an ambitious training program designed to mold the next generation of civilian DoD leaders.

The Defense Leadership and Management Program [DLAMP] was established in 1998, in response to what was seen by defense leaders as a shrinking pool of qualified upper management employees in the ranks of the civilian government workforce. The program brings together the DoD with major universities to provide mid-level civilian employees with six years of academic and practical experience in fields such as economics, resource management, international policy, intelligence, and media relations. The objective of the program is to prepare, certify, and continuously educate and challenge a highly capable, diverse, mobile cadre of senior civilians with DoD-wide capability.

"They [the DoD] saw that a great many of their senior managers were reaching retirement age, and they wanted a program that would help fill those ranks," Ott explained. "But the belief was that not enough effort has been expended on the leadership and management training of mid-level civilian employees. This program provides that."

A portion of the program involves a yearlong assignment to a different DoD component or occupational area. The assignment is meant to broaden the individual's work. Ott, who is Director of Planning and Resource Management for the Western District of the Defense Contract Management Command, chose U.S. Strategic Command to "get broader and personal knowledge of the warfighting perspective."

Since her arrival here in February, Ott has assisted

Al Buckles, USSTRATCOM's Executive Director of Operations and Logistics.

Like most DLAMP participants, DoD chose Ott for the program based on her "Department-wide perspective, formed from having responsibility for people, policy, and programs." Despite that perspective, she admits the program hasn't been easy for her. In addition to the fast-paced nature of the training and the demands of travel, she was also challenged by the evolving nature of the curriculum. The program is open to all GS-13 and above civilian employees.

"I was in the first group admitted into the program," she said. "At the beginning, we saw that the curriculum was too much like a business school and didn't address the issues particular to the DoD. Fortunately, we were able to offer input that helped change it to better serve the Department's needs."

Currently, more than 800 civilians are enrolled in the program. DoD's goal is to eventually fill more than 3,000 key leadership positions using DLAMP graduates. While the program can be demanding, Ott explains the rewards make it well worth it.

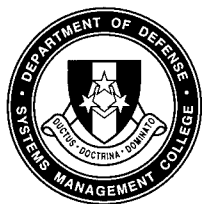
"This is not an easy or comfortable program to get through," she explained. "But it gives you the opportunity to look at the Department in a more global context and find ways of doing the mission in a more efficient, focused, and competitive way."

DoD civilian employees in grades 13 or higher who are interested in participating in the program must undergo a rigorous screening and nomination process, outlined in DoD Directive 1430.16.

Editor's Note: Meridith is with the USSTRATCOM Public Affairs Office, Offutt AFB, Neb. This information is in the public domain at <http://www.af.mil/news>. To learn more about DLAMP, go to <http://www.cpms.osd.mil/dlamp/index.htm> on the Civilian Personnel Management System (CPMS) Web site.

PM

Program Manager Magazine is the ideal forum for publishing your next article on acquisition reform, acquisition legislation, or acquisition current policies and practices. You are the subject matter experts – send us your successes, failures, lessons learned, or long-range vision for what may or may not work and why. In the process, gain peer exposure and recognition as a subject matter expert in your field. We want to hear from you and your associates – today.



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WHEN NOW

Invest Today or Stop Flying Tomorrow

A Critique of Outsource-Driven Depot-Level Repair

CAPT. KENNETH B. BOWLING, U.S. AIR FORCE

Chaos theory attempts to explain the fact that complex and unpredictable results will occur in systems that are sensitive to their initial conditions. A common example of this is known as the Butterfly Effect. It states that, in theory, the flutter of a butterfly's wings in China could, in fact, actually affect weather patterns in New Mexico, thousands of miles away. In other words, it is possible that a very small occurrence can produce unpredictable and sometimes drastic results by triggering a series of increasingly significant events.

Downward-directed decisions supporting near-term fiscal expediencies place at risk long-term military readiness. Yet, few write about the looming consequences of too much, too fast. If integrity, selflessness, and excellence truly reign, then critical dialogue is essential in the face of observable flaws, regardless of vogue. This article serves as one such attempt to stimulate critical dialogue on the subject of Air Force depot-level outsourcing.

Victory Without Results

Outsourcing Air Force depot-level repair in a tightly constrained budgetary environment has resulted in neglect of long-term, investment-based planning in favor of near-term executability. The Source of Repair Assignment Process (SORAP) is one culprit taking the Air Force to the brink. Embracing the Revolution in Military Affairs, particularly its accompanying Revolution in Business Affairs, is constantly "talked-up" as a cure to the ills of the acquisition and logistics busi-

ness. The dialogue is unbalanced. Ironically, as though directly ordered, many prematurely and incorrectly promote the benefits of our revolutions. And while mantra rages on, the proof is lacking, thus declaring victory without results.

It's a Balancing Act

General Shalikashvili, former Chairman of the Joint Chiefs of Staff, stated to Congress several years ago, "Today's modernization is tomorrow's readiness." This is an outstanding statement! The truth is, the statement is more accurate when modified to the following, "Today's modernization [with proper life cycle planning and investment, to support complex, eventually decades-old, military-unique hardware that is potentially the linchpin of national security, because we are doing away with redundant systems as inefficient] is tomorrow's readiness."

Joint Publication 4-0, *Doctrine for Logistic Support of Joint Operations*, requires individual Services to balance sustainability of a combat capability with economy, in the context of long-term objectives and capabilities.¹ It further states that this is the greatest challenge to the logistician. This is an unequivocal fact. Basic economics acknowledges lack of resources will drive costs higher. The limited resources in this case are depot-level repair contractors. Reality dictates that long-term support must be provided at the lowest cost or face insolvency. While these seem to be divergent planning factors, they are not. We can and must plan for both. Emphatically, they are both realities. Unfortunately, well-meaning, shortsighted planners, budgeteers, and managers fail to recognize

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the macroeconomics lesson that reveals the proper perspective: *Near-term investment provides long-term payback.*

As we live in a very constrained fiscal environment, many senior leaders have come to recognize the unfortunate fact that supporting military-unique hardware for up to four or five decades (i.e., B-52, KC-135, C-141, C-5, F-15, F-16,

Minuteman III) is *expensive and complex* (Figure 1). The corollary to this fact is self-evident: *Reducing operations and support costs is the key to realizing long-term savings in acquisition and logistics.*

One way to achieve these cost savings is competition, according to Secretary of Defense William S. Cohen in his November 1997 *Defense Reform Initiative*


(DRI) *Report*, which stated, "Competition between the public and private sectors works."² This may be true, but competing weapon system support with a sharply decreased defense industrial base can have unintended pitfalls unless they are identified and avoided.

Regrettably, the DoD and the Air Force in particular, have leveraged tomorrow's readiness in a valiant attempt to remain solvent in a budgetary drought. As a patchwork fix, we continue to increase modification programs that extend the life of our aging fleets, while many of our leaders look to acquisition and logistics reforms (particularly at our depots) to do the monumental task of creating savings for future modernization investment.

Integrated Weapon System Management

In the early 1990s, Integrated Weapon System Management (IWSM) emerged as the first real step toward radical reform in defense acquisition and logistics. A keystone of IWSM is the Single Manager (SM) concept, where one accountable individual has "cradle to grave" responsibility for an entire weapon system. From the long-term sustainment perspective, the problem with IWSM is that many System Program Directors (SPD) at Air Force product centers (Aeronautical Systems Center, Electronic Systems Center, Air Armament Center, Space and Missile Systems Center) vs. System Support Managers (SSM) at Air Logistic Centers (Oklahoma City-Air Logistics Center, Odgen-Air Logistics Center, Warner-Robins Air Logistics Center) have retained SM responsibility decades after a system has been fielded. This is problematic because very few of these offices have an experienced staff in depot logistics support.

Further, SMs continue unwisely to press for long-term sustainment by prime contractors via extremely limited competitions or sole-source contracts. To be fair, SMs cannot choose these contract arrangements on their own. In fact, there is a lengthy approval process, which may go all the way to the Air Force Acquisition Executive or higher. If this is a prob-



The DoD and the Air Force in particular have leveraged tomorrow's readiness in a valiant attempt to remain solvent in a budgetary drought. As a patchwork fix, we continue to increase modification programs that extend the life of our aging fleets, while many of our leaders look to acquisition and logistics reforms (particularly at our depots) to do the monumental task of creating savings for future modernization investment.

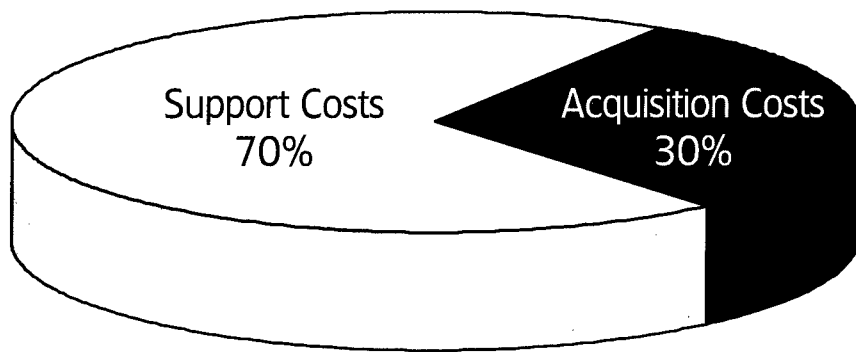


FIGURE 1.1. *Support Costs, Acquisition Costs*

lem (and I intend to show it is), where then is the advocate for government-organic logistics support? I'll address this issue later, but clearly, it has not been SMs.

SMs make recommendations based on their positions as "cradle to grave" owners. By default, they are first and foremost advocates for "their" single system, not necessarily for the Air Force at large. For this reason they are primarily fielding advocates (i.e., the cradle). The argument is that without a "cradle," there is no reason for a "grave." My assertion is that if you cannot support the weapon, then why birth it in the first place? Putting "rubber on the ramp" mentalities and political pressures did not disappear when IWSM was initiated. Therefore, SMs are under tremendous pressure to field a system ... *their* system. They lack a peer at SPD level who is equally ranked and is the proponent for long-term sustainment of individual weapon systems and the total force.

In many cases tension surfaces in the relationship between the SSM and SPD. The SSM reports to the SPD. Frequently, the SPD doesn't have a clear understanding of sustainment issues. The SPD has the "rubber on the ramp" view that doesn't deal with the realities of business and budget constraints of lifetime sustainment. Unthrottled, near-term executability is absolutely paramount on the SM's list.

To many SPDs, sustainment is oversimplified along the lines of comparing it to "strapping-on a mod." Once the mod is on, everything just falls into place. This

mentality ignores the long-term commitment of sustainment that changes daily. Often sustainment relies on the private sector, which expands and contracts to supply and demand, or the public sector (i.e., depots) that are contracting (getting smaller) due to budget woes. If IWSM could only be dismantled so the experts at the logistics centers could handle the sustainment issues, this would force disagreements between SSMs and SPDs to be resolved by Program Executive Offices (PEO) or at Secretary of the Air Force for Acquisition (SAF/AQ) level.

In some cases this is happening now. The problem is that the SSM usually doesn't get a strong voice above the SPD (their boss) to the PEO or SAF/AQ. Logistics support considerations take the back seat far too often. This places great risk on ownership costs for the warfighters and long-term readiness of the force. It dismisses every lesson taught in mandatory acquisition and logistics courses required under the Defense Acquisition Workforce Improvement Act and taught by the Defense Acquisition University (DAU). DAU courses teach that during the system engineering process, long-term logistics support considerations are equal to cost and performance considerations when trade-offs are being considered. Critics contend reality differs from theory. Agreed — so let us reconcile reality and theory with a specific example.

Case in Point

The Source of Repair Assignment Process (SORAP) is formerly known as the Decision Tree Analysis (Figure 2). It

is the primary process for making depot maintenance Source of Repair (SOR) determinations and for assessing organic depot maintenance requirements in accordance with DoD Directive (DoDD) 4151.18, *Maintenance of Military Materiel*,³ and Air Force Instruction (AFI) 21-102, *Depot Maintenance Management*.⁴ SORAP is used to determine the "best value" source of depot-level repair to support life cycle readiness.

Further, the SORAP must be completed and approved: 1) for all depot-level maintenance workloads generated by new acquisitions and modifications; 2) whenever there are significant changes to depot-level requirements; and 3) when depot-level workload is considered for workload shift (from organic to contract or vice versa). The process is flawed, not by intent, but because it is being implemented with loopholes, and final decisions are being based on near-term benefits, which are often politically, not business- or budget-driven.

The definition of the phrase "best value" is an ambiguous loophole that lends itself to being misapplied for near-term gain by senior decision makers who feel the pressures to field a system or modification without delay, despite unforeseen (or ignored) logistics concerns. Who decides the final outcome of the SORAP, and how are "best value" misapplications manifested? Let's look at five areas where the process misses the mark.

Logistics Concerns

First, DoDD 4151.18 states that depot maintenance SOR assignments shall be made by the acquiring DoD component logistics head.⁵ The Commander, Air Force Materiel Command is the responsible party as assigned by the Chief of Staff of the Air Force and the Secretary of the Air Force.⁶

Ultimately, these decisions are delegated to senior staff positions within the Command where clear understanding of all the issues involved may not exist. Under older acquisition and logistics models (pre-IWSM), there were two four-star Commands: Air Force Systems Com-

mand and Air Force Logistics Command. The Commands had equally strong advocates for acquisition and sustainment during the acquisition cycle. Realistically, they were operating under very different fiscal constraints, but they were always equal advocates.

Working in the current command structure, proper advocacy should come from within the IWSM framework. The Integrated Product Team (IPT) concept is designed to alleviate gross oversight of life cycle cost considerations. Rightfully, a colleague of mine has recently noted that advocacy will not always solve problems, but the absence of equal advocacy is the absence of a safety net and has become the overarching flaw in this process. If the IPT fails, there is no safety net, and balanced risk management does not exist. Unfortunately, advocacy is not the only problem with the SORAP.

Premature SOR Determinations

Where else does the process miss the mark? The second misapplication of the SORAP methodology occurs when SOR determinations (either contractor or or-

ganic) are made too early in the acquisition cycle. The reason for this is again shortsighted. The SORAP Manual states, "It is essential that actions required to obtain a SOR decision be taken as early as possible to avoid the expense and program turbulence associated with protecting both options until a decision is made."⁷ It also states, "... life cycle support decisions are made early in the design ... rather than waiting until after the design is completed." While I agree that waiting until the "design is completed" is a bit over-cautious, protecting both options until design *stabilizes* is prudent.

But the manual goes on to state, "The Single Manager should initiate actions as soon as reasonable ... but not later than the decision to proceed into Engineering and Manufacturing Development." The design is only conceptual at this point for many of the sub-systems of the end-item. Detailed support planning, by all accounts, consists of bare estimates at this early stage ... guesswork in many cases. If we plan to have no organic repair for an item, and the design is substantially altered and/or logistics

analyses prove inaccurate, the unprotected option becomes far more expensive than it would have been if we had paid the "liability insurance" to protect against this possibility.

Running the Fiscal Load

The third miss: SMs see investing in a new repair technology at an Air Logistics Center as a burden to their program. Hypothetically, if the navigation systems of the B-2 were similar to that of the Joint Strike Fighter and others, the B-2 program may have to bear the fiscal load of the initial investment to establish the initial capability at the depot. The investment required might be large compared to other program costs. The good news is that repair costs are very low and stable. The problem for the SM is this is "must pay bill, now." The SM may not have insight into the design to properly budget for such a large bill in a particular year. This lapse creates a supportability issue for the program.

Then the contractor estimate arrives, and it is much lower because they can do the repairs for a slightly higher cost than the

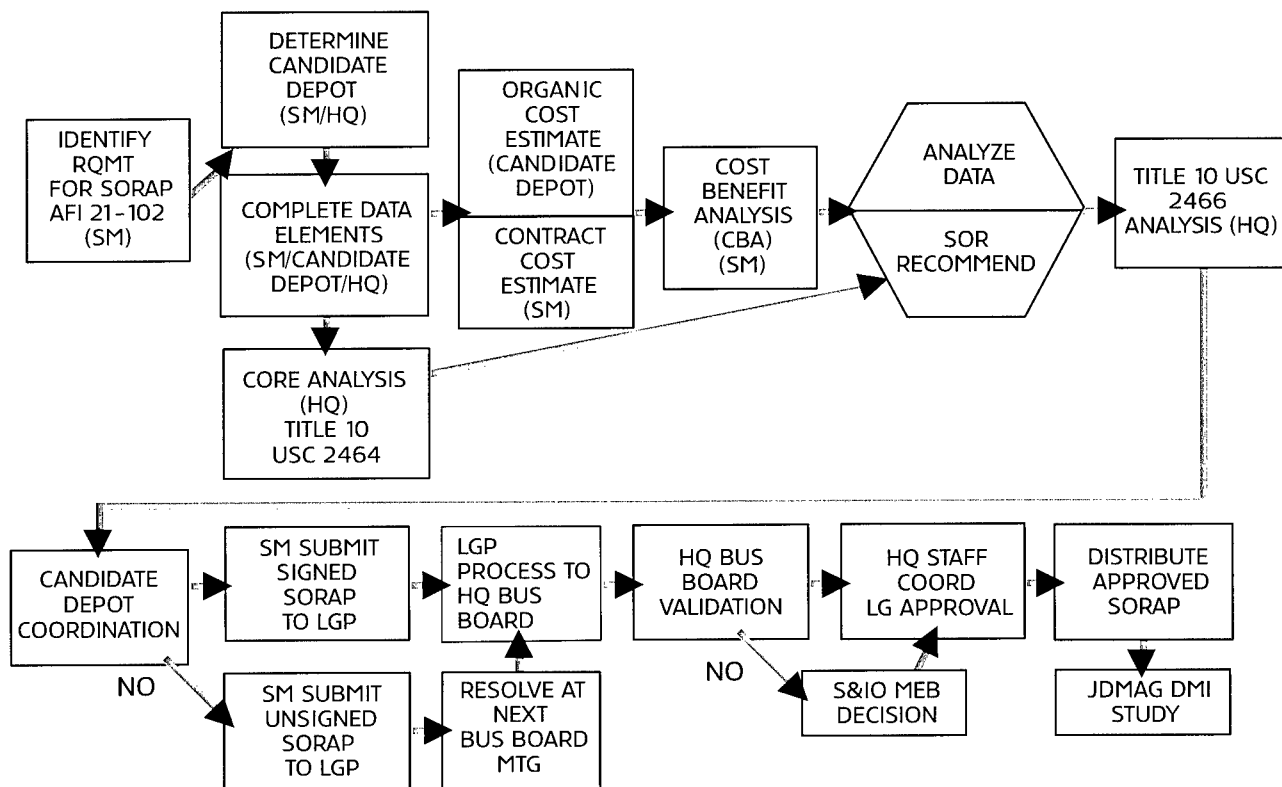


FIGURE 2. U.S. Air Force Source of Repair (SOR) Decision

government; but, there is no up-front investment required because they already own the capital equipment (used in production and test) and have skilled labor. The likely result is no investment is made. The effort goes sole-source to the prime vendor, and the out-year risk has jumped yet another notch. This is especially, even catastrophically, true if that contractor's business base contracts as it responds to the market's supply and demand.

The investment decision would have provided the opportunity to reduce life cycle costs for multiple weapon systems. This is the "greater-good" concept that the

SORAP ignores. It is the "best value" loophole in action. The decision appeared to be the "best value," but it was measured in that year only, and we again declare victory before results. The lost savings in out-years would have provided needed funds for future modernization efforts.

At the same time, it would keep the workforce at the Air Logistics Centers current on new technology. Instead, the near-term, expedient decision relegates the blue-collar workforce to antique fixer/dealer status. As an aside, ask yourself, "What youth today would want a job fixing half-century old (or older)

parts at a government depot, when they could work for a defense contractor making higher pay repairing new technology?" Indeed, the implications are far reaching.

Determining "best value" during the SORAP has not been based on long-term investment principles for the entire force. Further, until there is a fundamental change in policy, there is no chance this trend will naturally reverse. According to DoDD 5000.2-R,⁸ cost must be viewed as an independent variable. Accordingly, SMs are required to establish aggressive but realistic objectives for all programs and follow through by trading perfor-

Federal Acquisition Regulation Plain Language Initiative

The Defense Acquisition Regulations Council (DARC) and the Civilian Agency Acquisition Council (CAAC) are actively pursuing implementation of the President's memorandum of June 1, 1998, "Plain Language in Government Writing." The President's memorandum directed Executive Departments and Agencies to use plain language in future rulemaking documents and consider rewriting regulations in plain language as time permits. The National Performance Review and the Office of Management and Budget also have emphasized the importance of using plain language in government writing.

The DARC and CAAC have issued a *Federal Acquisition Regulation Drafting Guide* that applies to all amendments to the Federal Acquisition Regulation (FAR). The guide encourages simple writing through the use of common everyday words, short sentences and paragraphs, logical organization, and the active voice. The DARC and CAAC recently issued a completely revised FAR Part 25, "Foreign Acquisition," that incorporates the principles in the guide. The DARC and CAAC also recently

issued a proposed rule amending the FAR to include drafting principles that enhance a common understanding of the regulation. The proposed rule covers topics such as arrangement of regulations within the FAR and conventions for interpreting the FAR.

Currently, the DARC and CAAC are working on several FAR amendments to further the plain language initiative. These FAR amendments include a plain language rewrite of FAR Part 27, "Patents, Data and Copyrights," and a FAR revision to conform definitions in the FAR to the drafting guide. OFPP is working with the CAAC to ensure that the introductory descriptions of regulations in Federal Acquisition Circulars, which disseminate regulations amending the FAR, adhere to plain language principles.

The CAAC and DARC are committed to improving the FAR by adherence to the principles in the guide. A copy of the guide is available at the **www.ARNET.gov** Web site.

mance, supportability, cost, and schedule, beginning early in the program. This is not happening because "withholding program funds for unknown support investments" is nearly taboo, especially when that investment will not realize a positive return on investment for many years. The fact remains; organic supportability requires investment in infrastructure, equipment, and training. This is an up-front cost that is not easily planned and usually goes unbudgeted.

Premature Decisions

Fourth, Logistics Support Analyses (LSA), which include Mean Time Between Failure analysis, Failure Modes Effects and Criticality Analysis, Repair Level Analysis, and other maintenance-related analyses are completed by prime contractors. Two problems arise. One, the decisions of the SORAP are often complete before these LSA are mature; therefore, decisions about repair requirements and their associated costs are guesses, at best. Two, the entity that stands to gain the most if repairs are contracted out is the prime contractor. The entire cost comparison basis for the SORAP considers numbers of repairs, difficulty of repairs, cost of repairs, etc., as part of the "best value" calculation. Carefully crafted analyses, by profit-minded contractors in a shrinking business base, who have all the requisite support equipment, trained personnel, and technical data (they designed and produced the items) will almost certainly drive SOR determinations (especially for new technology) back into their own hands.

Competition and Repair Footing

Fifth, the SORAP does not provide for government and contractor entities to compete on an equal footing. The process has forced the initial investment costs of organic repair to be added to the overall cost-benefit-analysis model. Inequitably, the process allows contractor estimates to disregard this cost as a "sunk cost." The fact remains; they already have the capital equipment, trained personnel, extensive data and adequate facilities. So, we place ourselves in the position of accepting the recommendation for contractor repair. Seldom, in ex-

treme cases only, do we ever fully recover if this is the wrong course.

Outsourcing Reality

Acquisition and logistics reforms and the movement toward outsourcing are reality. They are unproven in the long-term, but a reality nonetheless. According to Secretary of Defense Cohen, "We see its fruits [outsourcing and competition] every day in the better service it gives our troops and the better balance it gives our ledgers. It empowers workers, both public and private, challenging them to provide higher quality and lower cost."

I agree we can see short-term "fruits every day." Will we see them in 20 or 30 years is the question. What is not said about the short-term is equally alarming. Overhead rates for Contractor Logistics Support contracts are skyrocketing, especially for sole-source vendors. This unplanned budgetary backlash is not easily disentangled nor publicly touted.

A final observation about outsourcing: Commercial entities are unstable by comparison to government entities, and their allegiances are to stockholders and profit-minded executives, not taxpayers. Therefore, when a business segment is 10, 20, or 30 years old or becomes insolvent or inefficient, it is divested. What are the remnants? Diminishing sources of repair, poor supply response, and spare parts shortages. I see it every day. And every day I see businesses going out of "the business" and the victims of outsourcing (warriors) frantically returning to the organic depot repair facility for emergency situations ... a day late and a dollar short.

Final Thoughts

At some level, the DoD is going to recognize that mission capable rates are destined for the basement, while Mission Impaired Capability Awaiting Parts (MICAP) hours are soaring toward the stars. Simultaneously, SSMs at the Air Logistics Centers are going to see weapon system support cost become impossible to manage as they become the only customers in the world for a single handful of extremely expensive con-

tractors. Contractors who are fully aware that the Air Force has established no other option than to pay the bill for a must-have combat capability that supports *Global Engagement: A Vision for the 21st Century Air Force*.⁹

Historically, senior leaders and strategic planners mistrusted ideas that were radical, rapid, and revolutionary. They preferred calculated, complete, and correct. The SORAP and outsourcing in general stand as examples of getting the order wrong. I fear the, "Fire! Ready! Aim!" syndrome has arrived. Ultimately, who pays the highest price? If not warfighters on the battlefield or in the battlespace, then it may be the American who loses an irreplaceable treasure—a son, a daughter, or perhaps worse yet, *freedom*.

Editor's Note: The author welcomes questions or comments on this article. Contact him at **Kenneth.Bowling@tinker.af.mil**.

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Taking Theory to Practice

MAJ. TODD JOHNSTON, U.S. AIR FORCE • DR. BERYL HARMAN

The Defense Systems Management College Advanced Program Management Course (APMC), the College's premier course offering since its beginnings as the 20-week Program Management Course in 1971, is aimed at providing the student a balanced curriculum that places emphasis on students' ability to take theory and put it into practice. As such, the curriculum not only takes into account needs of students in terms of technical learning in a multifunctional workplace, but also needs of individuals in terms of self-development and how to use limited manpower resources effectively in today's acquisition environment.

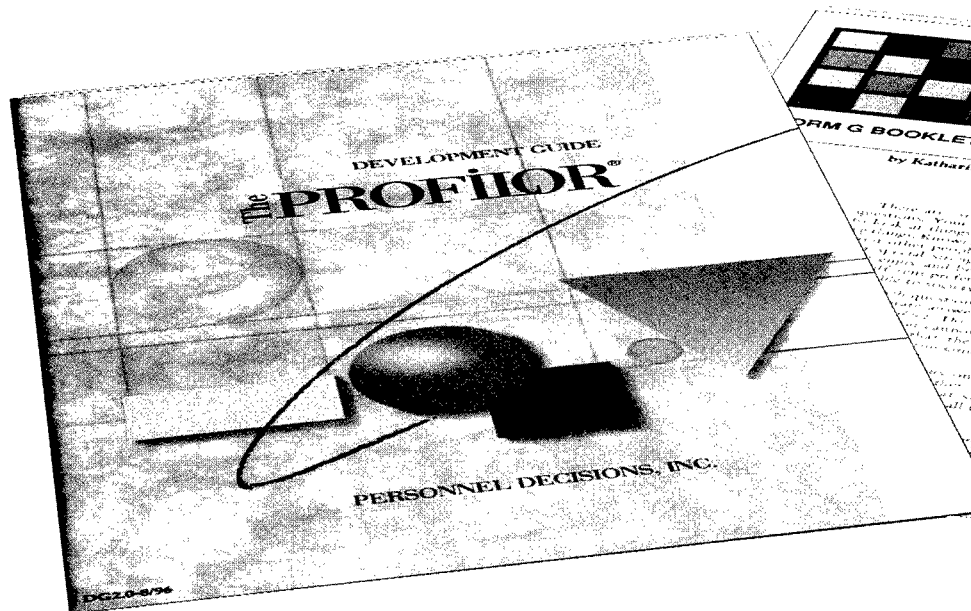
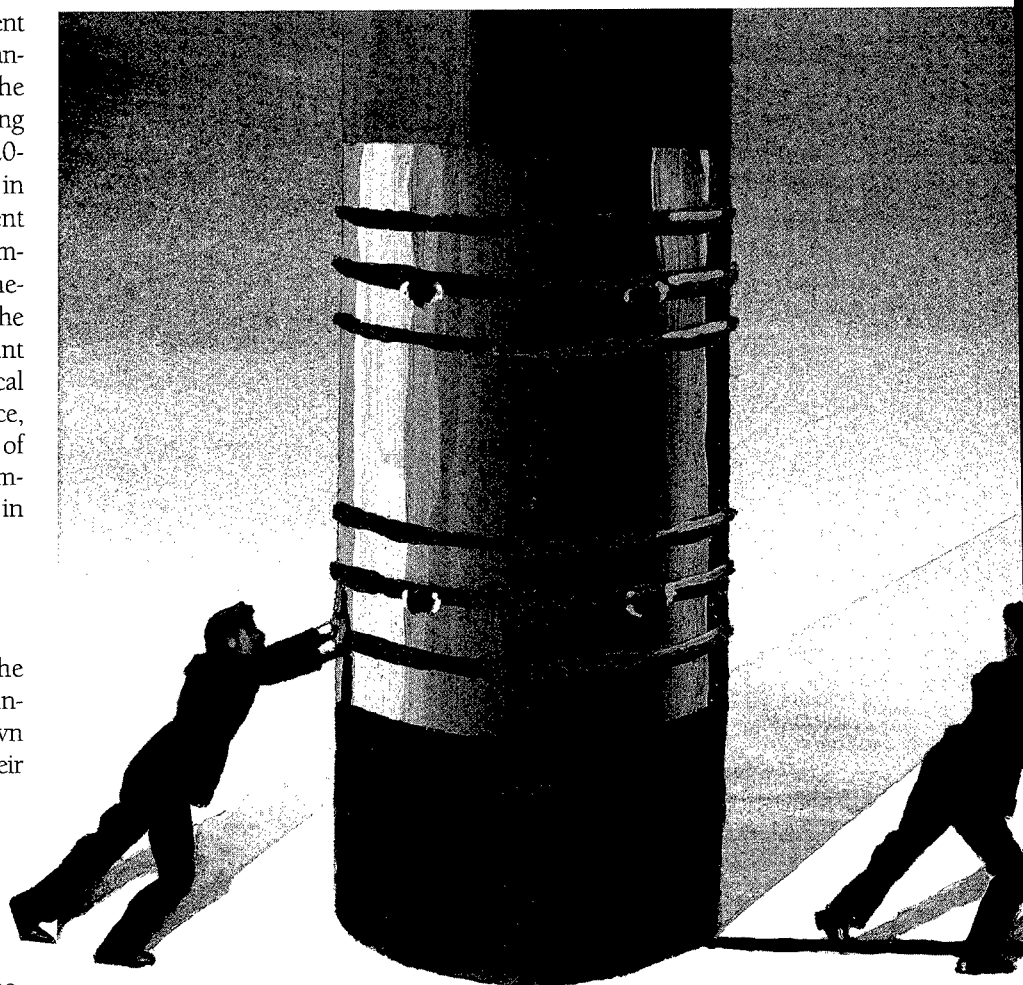
Two Useful Instruments That Have Proven Their Worth

To this end, students attending the course are administered two useful instruments, not only to increase their own self-understanding but also to assist their colleagues in understanding them.

The first instrument is the Myers Briggs Type Indicator, which assists students in understanding their personal preferences and helps them recognize how other people perceive them. This instrument has been the subject of considerable research and will not be addressed further in this article.

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RESULTS

The second instrument is the PROFILOR and the focus of this article. Developed by Personnel Decisions International, it affords students the opportunity to receive 360-degree feedback from their supervisors and peers, and direct reports on 24 critical skills that a Program Manager (PM) needs to per-

form successfully. The PROFILOR asks raters to evaluate the extent to which the target manager performs each of 135 different behaviors using a 5-point scale. The ratings from several behaviors are then combined to generate a rating for each skill. Students are then encouraged to review and assess the feedback with a view to identifying their strengths and selecting areas for potential improvement. They are also encouraged to devise ways in which to leverage these strengths as a means to develop new skills in areas of possible improvement. These ideas are subsequently incorporated into an improvement plan to be initially implemented during APMC and then continued, hopefully, upon return to the workplace.

Analysis

Analysis of the PROFILOR skills assists a Deputy PM (DPM) in identifying, developing, and performing more effectively the significantly different roles and responsibilities required of a successful PM. PROFILOR's primary value is, however, that it allows students to focus and target some of their learning on those interpersonal, relationship-type activities that can have enormous benefit back in the workplace. As one student noted:

"I looked at the major functions and the relative time I spend on the functions I perform as a DPM and then did the same for the PM position. This chart [Figure 1] incorporates the functions I perform and outlines my time allocation estimates.

"This process really drove the point home that as the PM I would need to transition from performing skills requiring

technical knowledge to performing leader and manager functions. Several of the primary managerial functions such as negotiating, supervising, and coaching are areas I don't do at all as the DPM. Therefore, these are the skills I decided to focus on developing at APMC. The improvement plan is one of the primary tools that can be used to develop these skills."

By focusing on the perceptions of others, students build a clear picture of how they are perceived as managers and as leaders. From these perceptions, students can build a personal self-development plan to use in creating the image they desire.

APMC Tools

In addition to the improvement plan, based on PROFILOR feedback students have the opportunity to develop and participate in an Individual Learning Plan (ILP) and a Program Management and Leadership (PML) project. These two activities allow students to focus their learning and practice new skills in a non-attribution environment while attending APMC. The ILP is a minimum of 40 hours that APMC students spend tailoring their learning objectives. As the basis for this student-tailored learning, it combines elective classes and research (Internet, books, tapes, or videos for example). The PML project requires that students develop their primary goal while at APMC and prepare a plan of action for achieving it. As another student noted:

"I focused much of my ILP effort on supervising, negotiating, and developing the skills to be a better team leader/mem-

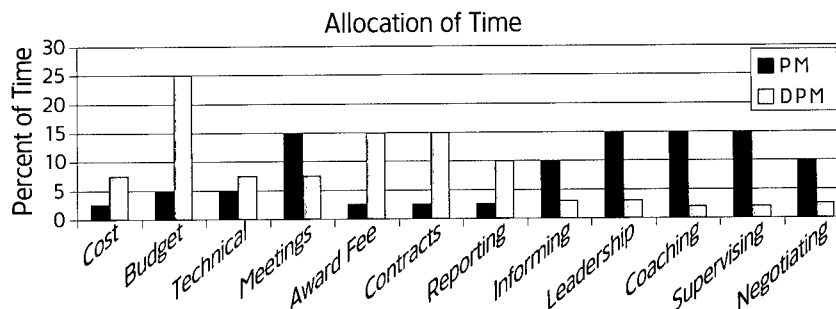


FIGURE 1. Time Allocation and Time Allocation by DPM

IPT Co-chair	Government Team Lead
2 Consider people's feelings in decisions.	1 Influence upper management decisions.
3 Know which battles to fight.	2 Consider people's feelings in decisions.
4 Compromise to build relationships.	3 Know which battles to fight.
5 Be tactful.	5 Be tactful.
6 Be patient.	6 Be patient.
7 Analyze problems from different viewpoints.	10 Convey trust in people to do the job.
8 Promote "we" thinking in groups.	11 Address and work to resolve conflict.
9 Work toward win/win.	12 Let people know when they are performing well.
11 Address and work to resolve conflict.	

FIGURE 2. Allocation of Improvement Areas to Primary Roles

ber. My primary PML goal was to develop conflict/anger management skills to create win/win situations at home and work. The combination of the improvement plan (using the PROFILOR feedback), the ILP, and the PML project gave me an excellent opportunity to identify and address areas in my skill set that need improvement."

PROFILOR Feedback

With a better understanding of the skills critical to a PM as identified by the PROFILOR, students can determine how they rate against other PMs in the acquisition environment. The "norm" base that students analyze themselves against is built from the inputs of prior anticipatory PMs; by comparing themselves to the "norm," students can see how they match up to the profile of their potential peers. For instance, the following 12 areas (not in any priority) could be used as a basis of improvement. Each area would have received a rating from the supervisor, peers, direct reports, and the individual being rated so that the level of agreement or disagreement could also be tallied:

- 1 Influence upper management decisions.
- 2 Consider people's feelings in decisions.
- 3 Know which battles to fight.
- 4 Compromise to build relationships.
- 5 Be tactful.
- 6 Be patient.

- 7 Analyze problems from different viewpoints
- 8 Promote "we" thinking in groups.
- 9 Work toward win/win.
- 10 Convey trust in people to do the job.
- 11 Address and work to resolve conflict.
- 12 Let people know when they are performing well.

When students first receive this type of information, they are either surprised or feel that the information reinforces what they already know. Therefore, the first nine items on this list could come as absolutely no surprise, while the last three areas, in which the individual felt competent, could come as a complete surprise. Students then must decide whether this feedback indicates a need for personal improvement in their chosen career fields.

Application of Feedback

In today's acquisition environment of constrained resources and ever-changing requirements, PMs must master two primary roles:

- Co-chair or chair a program's Integrated Product Team (IPT) with prime contractor participation.
- Lead a government team.

By applying a systems approach for allocating the 12 areas for improvement to these two primary roles, students can ascertain where their personal develop-

ment needs should be focused. Moreover, applying the systems approach allows students to create a picture of their learning needs and provides a way in which they can determine which activities should be focused on first. Figure 2 shows a potential breakout of this allocation.

Within these two roles, the primary skills that need to be developed are *team member*, *leader*, and *manager*. For example, looking at the primary skills within each one of the two roles and how the specific 12 areas fit within them, leads to the following assessment in terms of development needs:

TEAM MEMBER

Effective Negotiation Skills (4, 5, 6, 7, 8, 9) and Conflict/Anger Management Skills (2, 5, 6, 8, 9, 11)

LEADER

Develop Vision/Goals (1, 3, 10) and Support Leadership's Vision/Goals (1, 3)

MANAGER

Coaching (2, 9, 10, 12) and Supervising (10, 12)

Once assessed, students have the ability to allocate these specific skills to the specific lesson(s)/electives, and learning media that would support that skill, and then plan their time accordingly (Figure 3).

Application of Lessons

The last step in this process is to develop lessons learned for each major skill practiced during students' time at APMC for use when they return to the workplace. Since each area is different, students need to develop some method or "model" to assist in the memorization process. Alternately, students can develop an overarching strategy for implementation or a list of questions that can be used as a sanity check for handling certain issues.

Suggested Example Approaches

The following discussion provides suggestions on ways in which the time allocation (Figure 3) could be used to provide improvement and some thoughts

on how you can take that information and use it back in the workplace.

Negotiator (Questions)

The negotiations tape entitled *Negotiating Skills in the Workplace*,¹ provides two major strategies that could be used to address areas of self-improvement. The first strategy is to "Start with the end in mind." Simply put, this means to look ahead to where the negotiations need to finish and from this perspective, define the objectives and bottom line.

The second is to focus on the long-term relationship that PMs will have with their prime counterparts and try to understand what is needed to succeed. The goal is to work with prime counterparts (not against them) to translate their needs and PMs' objectives into a solution. To help this process, several questions need to be addressed.

- 1 What is my bottom line?
- 2 What is my top priority, and what can I trade off?
- 3 How can we work to make this a "team" win?
- 4 Is someone involved threatened (their job, bonus, resources) by this process?
- 5 Have I let my emotions take over, and if so why?
- 6 What is our time frame for the process, and who is constrained by this?
- 7 What do "they" need to win in this process, and can I provide it?
- 8 Are there creative ways to resolve this other than positional bargaining?
- 9 Who has most/least power and why?

Through the use of these questions, PMs can focus on the interests of the parties involved and not the individual in reaching an acceptable solution that will facilitate a long-term relationship.

Anger/Conflict Management (Model)

The PROFILOR instrument indicates that anger/conflict management is an important area for improvement. This area can be significantly improved

through understanding how to deal with situations, and this is an area where students can reap benefits from the ILP process. Many tapes are available on the subject; e.g., Miller's tape entitled *Self Discipline and Emotional Control*,² that help students understand the roots of conflict. This means listening to others, acknowledging their position, accepting their perspective, stating a position without emotion, using compromise (negotiation), and following up on actions. When conflict is a result of a difference in knowledge, skills, or abilities, experts tell us to focus on closing the "knowledge" gap and thus reducing the conflict rather than focusing on the conflict itself.

In addition, Ebier's *How to Manage Conflict, Anger, and Emotion*,³ tells us to focus on assertive behavior that allows for a win/win solution rather than a passive/aggressive behavior that allows for someone to lose. He also focuses on a need to re-think (positive self-talk before the conflict), repeat (practice), and re-frame (look for the positive after conflict) before taking action.

Since much of the conflict in IPTs is a result of dealing with prime team counterparts, one way to handle the situation is to develop a specific model for handling the conflict. Students need to begin with the idea of creating a win/win situation. Since this still implies an us/them situation rather than the team, it should be addressed as a big win resulting in: WWIINN. The student can then approach the situation by removing the idea of what "I Need" leaving us with

WWIN and replacing the "I Need" idea with The Team. This translates to WTINTW: *What The IPT Needs To Win*.

With this type of anagram the student can remember to:

- 1 Take out personal interest.
- 2 Use empathy for others.
- 3 Start with the end in mind.
- 4 Look for the team answer, not the right answer.

Leadership (Strategy)

The next phase of a DPM's career (progressing to a PM), will emphasize leadership in lieu of technical and managerial skills. This means when transitioning from DPM to PM, an individual will go from being "Mr. Inside" who keeps the program running on a daily basis to "Mr. Outside" who looks at the big picture and interfaces with the customer, contractor, headquarters, and inspectors for example. The DPM role often lends itself to playing the "bad cop" routine with both the contractor and with upper management, or playing the "devil's advocate" on occasion to get the job accomplished. However, PMs need to re-focus their energy and do a better job of understanding and implementing the organization's vision and goals. To do this, they need to analyze what the organizational vision and goals really mean and how they should go about the task of implementing them.

Many sources during the APMC course emphasize that the leader's primary responsibility is to provide a vision for the organization. Therefore, the IPT must

Skills	ILP	ILP	ILP	PML
	Tape	Video	Elective	Lesson
Negotiating	4 hrs			
Conflict/Anger Management	6 hrs	4hr		2 hrs
Develop/Support Vision/Goals				3 hrs
Coaching		1 hr		2.5 hrs
Supervising			4 hrs	

FIGURE 3. Time Allocation to Skill Improvement

focus as a team, and the PM's primary job will be to provide that focus. A way in which to do this is to spend time with the co-chair of the IPT to lay out the vision. The next step is to engage all IPT members in deliberate discussions to set goals and objectives, followed by development of a detailed implementation plan to support the goals and objectives. Suggested ideas that could be included and implemented in a team strategy follow.

- 1 Invite suppliers to IPT.
- 2 Ensure customer is involved in weekly IPTs via teleconference or attends a meeting at least once a quarter.
- 3 Create vision, goals, and measures for the IPT; monitor the team's success in supporting them.
- 4 Increase trust by opening up budgets, Award Fee process, and upper management meetings.
- 5 Improve Award Fee process by taking it out of IPT meetings.
- 6 Develop and live by rules within IPT.
 - Meeting rules: agenda, minutes, time.
 - Coordination rules: verbal, written, E-mail.
- 7 Visit with Defense Contract Management Agency, subcontractors, vendors, and customers to get their input to IPT.

Once the team plans a viable strategy, the PM must take the time necessary to implement it back in the workplace.

Coaching

To form an effective team, PMs must let go of many activities that they currently perform as the DPM. One of these activities is to transition from a directive mode of leadership to a coaching mode. In order to get the most from team members, PMs should empower and coach them to operate autonomously. Cleese's tape, *The Helping Hand Coaching Skills*,⁴ recommends that the following issues be addressed in the coaching sessions:

- 1 Agree on the topic (its scope and content).

- 2 Identify the goals (ensure subordinates do this with guidance).
- 3 Promote discovery (don't give detailed instructions and let subordinates make mistakes).
- 4 Set the parameters (supervisors must assess learning vs. mission need and set parameters that support both. In addition, subordinates must feel they have enough latitude to operate within the parameters and that their skills support operating within them).
- 5 Authorize and empower (take steps to let others know subordinates are empowered).
- 6 Recap (make sure you are on the same page).

Although the activities named here provide a good structure to follow during the coaching sessions, the process of listening actively, asking questions, giving feedback, and making suggestions is where the real work will come in.

Dr. Covey in his discussion on *The 7 Habits of Highly Effective People*,⁵ highlights different levels of listening— from ignoring to empathetic listening. Another area that takes significant concentration is giving feedback. The type of feedback being delivered should be based on the needs of the individual being coached. This should include both positive (focusing on the strengths) and negative (focusing on areas of improvement) feedback. Care should be taken to provide honest feedback, but also consider the feelings of the individual so that "buy-in" is achieved. The bottom line is that coaching is necessary to build a strong and autonomous team and is the only way to ensure success given the limited personnel assigned to the program.

Supervising

Most DPMs have many of the skills necessary to supervise military members but may not have the necessary skills required to supervise civilians. A way in which to correct this problem is to take a short elective course on the civilian personnel system or the military system if the reverse is true. This provides a top-level understanding of what a DPM

needs to know. The Civilian Personnel Operations Center has the expertise and is a great resource for learning to supervise civilian employees.

In addition, students may need to plan additional training back at their workplace. It may also mean relying on someone with the necessary expertise to provide guidance until the additional training and experience is acquired. A benefit of attending APMC at DSMC is the network of resources available for students to augment the knowledge they already possess or obtain answers to current or future questions that may arise.

Self-Improvement — Students Are Best Judges

The DSMC curriculum provides the opportunity for students to acquire information and devise methods for self-improvement. This article discusses a methodology by which this may be accomplished. However, it is up to the individual student to determine their own needs and how best to use the resources available. The important thing to remember is that DSMC provides the opportunity. It is up to the student to take advantage of what is offered.

Editor's Note: The authors welcome questions or comments on this article. Contact them at ToddJohnston@hill.af.mil or harman_beryl@dsmc.dsm.mil.

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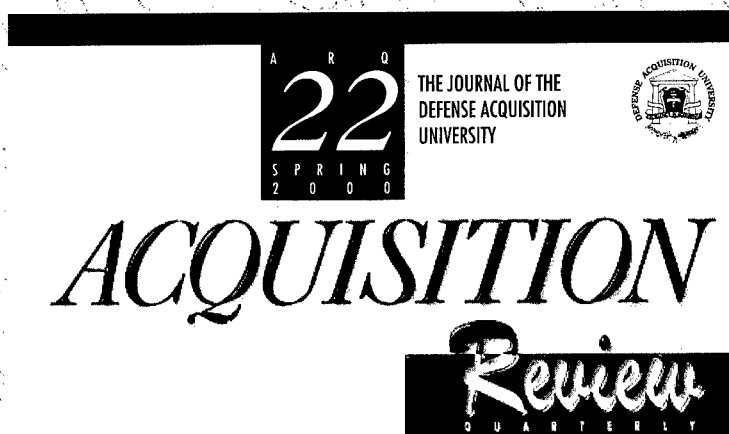
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Innovations in Logistics Modernization

Wholesale Logistics Modernization Program (WLMP) Will Overhaul Army's Logistics System

VICTOR J. FERLISE

In this era of continuing downsizing and budget decrements, the biggest challenge we face is finding creative and innovative solutions to the problems that confront us, coupled with the perseverance to see them through to successful conclusion. The U.S. Army Communications-Electronics Command (CECOM) and its Commanding General, Army Maj. Gen. Robert L. Nabors, recently encountered and successfully confronted such a challenge when faced with the pressing need to overhaul the Army's automated logistics systems. At the same time, Gen. Nabors was charged with implementing a mandated reduction of 1,400 personnel spaces with a corresponding budget decrease.

No Longer State Of the Art

By the early 1990s, a wide chasm had grown between the Army's requirements for logistics automation and the capabilities of its two antiquated logistics and depot maintenance systems: the Commodity Command Standard System (CCSS) and the Standard Depot System (SDS). These systems dated back to the early 1970s, were based on Common Business Oriented Language (COBOL), were tied to the Defense Information Systems Agency's (DISA) mainframe/megacenter batch processing, were increasingly complex, and were very expensive to maintain.

Through a patchwork series of enhancements effected by very dedicated government workers at CECOM's sup-



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port centers in St. Louis, Mo., and Chambersburg, Pa., the Army limped along with these systems through the 1970s, '80s, and '90s.

Joint Logistics System

The Department of Defense (DoD) attacked this problem in the early 1990s with the Joint Logistics System (JLS). The objective was to generate new code for all logistics systems throughout DoD. During this period, the Services were precluded from adding any enhancements to CCSS and SDS, making these systems even more out of step with both the Army's logistics needs and modern, technological advances in

and attempted to sell their solutions to DoD and the Army. Industry's objective, of course, was to obtain a sole-source contract for installing new proprietary systems. The other obvious alternative, consistent with the Army's traditional approach to solving a problem of this nature, was to expend hundreds of millions in capital investment money by awarding a contract for the development and installation of a new logistics automation system specifically designed to meet the Army's needs.

Several studies were made in this area and some Services did, in fact, award such contracts. With either approach, however, the Army still had to maintain

able. Our workforce, immersed in maintaining our COBOL-based systems, was unable to keep pace with the increasingly rapid technological advances required to create, integrate, and maintain a new system. And we still had downsizing targets to meet. In short, there was no way to solve our problems without adopting a bold and innovative approach.

Taking Stock

To quote Dr. Albert Einstein, "In the middle of difficulties lies opportunities." In fashioning the solution — known until recently as Logistics Modernization (LOGMOD), now referred to as the Wholesale Logistics Modernization Program (WLMP) — we began by taking stock of the opportunities available to us.

- First and foremost, the acquisition leadership throughout DoD was committed to acquisition reform — not reform for reform's sake, but to achieve substantive innovations in the processes the government uses to acquire products and services.
- Second, we did have the cash flow of approximately \$40 million a year for maintenance, which could be expected to increase over time.
- Third, automation advances had resulted in systems much more adaptable, upgradeable, reconfigurable, scaleable, and interoperable than was possible when the initial COBOL systems were built.
- Fourth, the commercial sector had expended significant amounts of money in developing the science of supply chain management via velocity management and similar techniques. Companies were advertising that, within one day of receiving an order, they could have a product en route to any customer in the world.

So again, the challenge was to find a way that the Army could capitalize on the advances that had occurred in the commercial world and DoD's commitment to acquisition reform, that did not require the influx of additional dollars over and above the estimated annual maintenance costs.

After consideration of various alternatives, we focused on the development and implementation of a strategic, partnership-type arrangement that would contractually commit all our businesses in the logistics automation area to one contractor over an extended period of time.

automation and supply chain management. For a variety of reasons, JLS failed to produce the desired results.

Meanwhile, the Army continued to march forward toward a completely digitized force, while dragging behind archaic logistics systems.

While the Army's situation became more acute, industry took significant steps forward in automation and supply chain management for the commercial sector

the existing systems at a cost of almost \$40 million per year until a new system was in place. Once the new system was in place, the cycle would begin again and we would soon be facing the problem of maintaining the new software and keeping up with ongoing technological advances.

The problems confronting us were many, and would have been insurmountable had we clung to the traditional ways of doing business. The money — the investment capital — was simply not avail-

Strategic Partnership

After consideration of various alternatives, we focused on the development and implementation of a strategic, partnership-type arrangement that would contractually commit all our business in the logistics automation area to one contractor over an extended period of time. Further, we would reserve the right to extend the term and expand the scope of the contract as the needs of the government dictated. We would develop a Request for Proposal, thereby generating a serious competition among commercial bidders to ultimately attain a single strategic partner. This, we anticipated, would bring us forward to a modernized system of logistics services.

Accordingly, we structured a solicitation that would prompt industry to partner across disciplines to compete for CCSS and SDS modernization. We made a fundamental switch from the procurement of systems to the acquisition of services. To keep the effort manageable, we purposely limited modernization to two systems unlike JLS, which proposed a "silver-bullet" solution to fix all logistics systems.

At the outset we recognized, as did industry, that this approach could achieve savings of about 20 percent in DISA's megacenter processing. To this end, we worked extensively with DISA, who supported us in every way. My personal belief was that, while the savings in processing costs would be fairly stable, the savings in maintenance costs would be increasingly and significantly higher because of the agility of modern automation systems.

WLMP — It Takes a Team

To ensure the successful implementation of our proposed solution and with the enthusiastic support and commitment of all CECOM Directors and key players at the Army Materiel Command (AMC), we established what we called the WLMP Team, headed by Paul Capelli, an outstanding leader from our Logistics and Readiness Center, as the project manager. We populated the team with a multitude of experts, the best and brightest, from across CECOM and AMC.

The team took the nucleus of the plan and synergistically improved it in innumerable ways. One example was the award factors to motivate the contractors. We structured the solicitation so that the contractor would be highly motivated not just to satisfy, but to exceed the Army's needs throughout the 10 years of performance. In our initial guidance, we made it clear to industry that the competition was not only for the initial award, but also for the long term. The solicitation reflected that, as our strategic partner, the successful offeror would continue to receive our business if it tendered the desired results during the term of the initial contract.

Concerns

The plan was met with considerable resistance by our union. Unlike the American Federation of Government Employees' participation with the Navy during their 1997 transition of the Naval Air Warfare Center, Aircraft Division, to Hughes; the National Federation of Federal Employees, despite our efforts, declined to participate with us in the WLMP process. The union was committed instead to an A-76 competition in which the government workforce would compete with industry for the work. We knew that approach was not viable in this case, and we were concerned about what would happen to our employees when a contractor inevitably won the A-76 competition.

Under A-76 procedures, government employees are guaranteed rights of first refusal for employment "openings" under the contract in positions for which they are qualified. However, there was no guarantee that the successful offeror would have enough, or any openings for our government employees or that the openings would be with pay, benefits, or hours comparable to their government jobs.

Accordingly, we obtained a waiver to the A-76 process and focused our efforts on ensuring that the successful contractor would guarantee our employees a comparable job with comparable benefits. We were seeking a win-win situation — an award to a contractor who would

excel at modernizing our logistics systems, make a profit, and guarantee our employees a "soft landing."

As is often the case with new ideas, the plan sparked concerns within the government bureaucracy and created a great deal of interest in Congress. Innumerable trips to Capitol Hill were required for meetings with staffers and congressmen, as well as with officials at various levels in the Army and DoD. Fortunately, the program enjoyed the support of key leaders such as Dr. Jacques S. Gansler, Under Secretary of Defense, (Acquisition, Technology and Logistics); retired Navy Adm. David Oliver, Principal Deputy Under Secretary of Defense (Acquisition, Technology and Logistics); the Secretary of the Army; and the Army Chief of Staff.

Response From Industry

Our greatest expectations were exceeded by the response from industry to this new and innovative approach to doing business. Rather than proposing individual system solutions, industry collaborated on a scale that I have not seen in almost 30 years of government service. They built cross-functional teams to meet the government's needs in the best way possible. The competition was extraordinary and resulted in two outstanding proposals from market leaders. As we reviewed the proposals, it was clear that industry had bought into our concept, was prepared to do business in this new manner, and was excited about leading the way in acquisition reform.

Industry was also very interested in hiring our people. There were other COBOL systems still in existence and, while our experts could not rival industry's ability to build new systems, they were outstanding at repairing old systems. Therefore, our employees had an intrinsic value to the contractors above and beyond efforts associated with their performance of the WLMP contract. The winning contractor agreed to offer our employees a minimum three-year contract, \$15,000 bonus (in some cases more), comparable pay and benefits, training, and a job site in St. Louis or Chambersburg, their original place of

employment. We had truly achieved our objective — a win for industry, a win for our employees, and a win for Army logistics.

The Bottom Line — Keeping Pace

More importantly, our logistics modernization business process review resulted in a changed paradigm, a new way of doing business. It is the embodiment of acquisition reform and represents an outstanding acquisition achievement that will provide the Army with a support system to keep pace with the digitized force and successfully rival any commercial system.

Additionally, since it is trading on commercial technologies, it will keep pace with continuing advances in supply chain management and automation. It will cost no more than we were spending on maintenance, and requires no additional capital investment expenditure. The associated reduction in government employees will bring us a step closer to achieving our manpower efficiencies while simultaneously providing a soft landing for our employees.

This was an extremely challenging program and an enormous opportunity for all the outstanding people who made WLMP a reality. All of us involved with the program are proud of this achievement and look forward to more success in the future. There are many innovative ways of doing business, but our bureaucracy is often uncomfortable with change and trains us, from day one, to follow established procedures. That mentality constrains our thinking along narrow paths that will not easily lead to successful resolution of the kind of challenges that await us.

It is difficult for us within government to fashion solutions like WLMP; nevertheless, for both logistics and communications systems, this type of innovation is the essence of CECOM's contribution to the Army of the 21st century and beyond.

Editor's Note: The author welcomes questions or comments on this article. Contact him at ferlise@mail1.monmouth.army.mil.

Retired Navy Rear Adm. Mike Sullivan became the Navy Chair, DSMC Executive Institute, effective March 20, 2000. Prior to his retirement from active duty in late 1998, Sullivan was the Principal Deputy Assistant Secretary of the Navy (Research, Development and Acquisition). A graduate of the University of Kansas, he completed his M.B.A. at the University of North Carolina at Chapel Hill. He also attended the Industrial College of the Armed Forces and Carnegie Mellon University's Program for Executives.



John C. Wilson Jr. became the DoD Chair, DSMC Executive Institute, effective Feb. 1, 2000. Wilson comes to the College from the Pentagon where he served for the past year as Director of Systems Acquisition, Office of the Under Secretary of Defense (Acquisition, Technology and Logistics). Prior to his Pentagon assignment, he was the Executive Director of the Air Force Electronic Systems Center, Air Force Materiel Command, Hanscom AFB, Mass. A member of the Senior Executive Service and federal employee since 1974, Wilson holds a Bachelor of Business Administration in Accounting from the University of New Mexico and a Master of Arts in Business Management from the University of Northern Colorado. He is a Certified Public Accountant; holds professional designations in Cost and Price Analysis and Contract Management; and is Level III-certified in Program Management, Financial Management, and Contracting.



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ONR Spearheads Successful Mine Countermeasures Program

Let Common Sense Rule

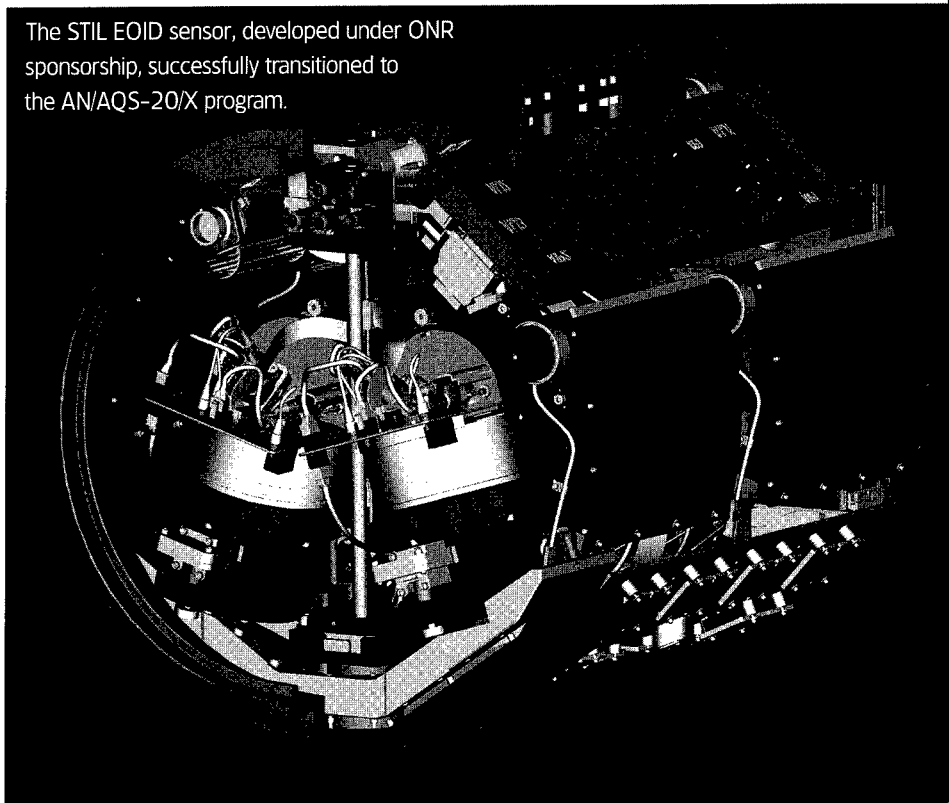
R.S. JACOBSON • JOHN MCLEAN • STEPHEN G. HUNT • MARY CAMERON HULGAN

In this article, we examine the managerial and programmatic processes that successfully enabled a Science and Technology feasibility project to transition into an Acquisition effort within the Department of Navy. We also identify a number of "lessons learned" that other program managers and industrial performers may find useful to follow in their own program management efforts. While many of them are commonsense and practical, our experience is that most of these principles are often not followed for a variety of reasons. While we make no claim that following these principles will ensure success nor are they the *only* keys to success, we believe it is important to offer these principles as program management options well worth future consideration.

What Went Right

Despite formal training of Department of Defense personnel for management of programs and projects, programs can go awry, either in terms of schedule, cost, or technical performance. While much has been written regarding "lessons learned" from such experiences, it seems rare that successful programs are examined for what went right. We have been involved in a very smooth-running program for nearly five years; fortunately, nothing has emerged in the way of schedule, cost, or technical performance challenges that could not be overcome with routine, minimal effort.

The STIL EOIDS sensor, developed under ONR sponsorship, successfully transitioned to the AN/AQS-20/X program.



In this article, we intend to explain how our collective management style and procedures facilitated this success, yet recognizing that what we learned may not apply to all other programs at all times. Nevertheless, we believe that a number of essential management practices we used over the past five years may be beneficial for many programs and projects. Admittedly, we did not start out the project with these specific manage-

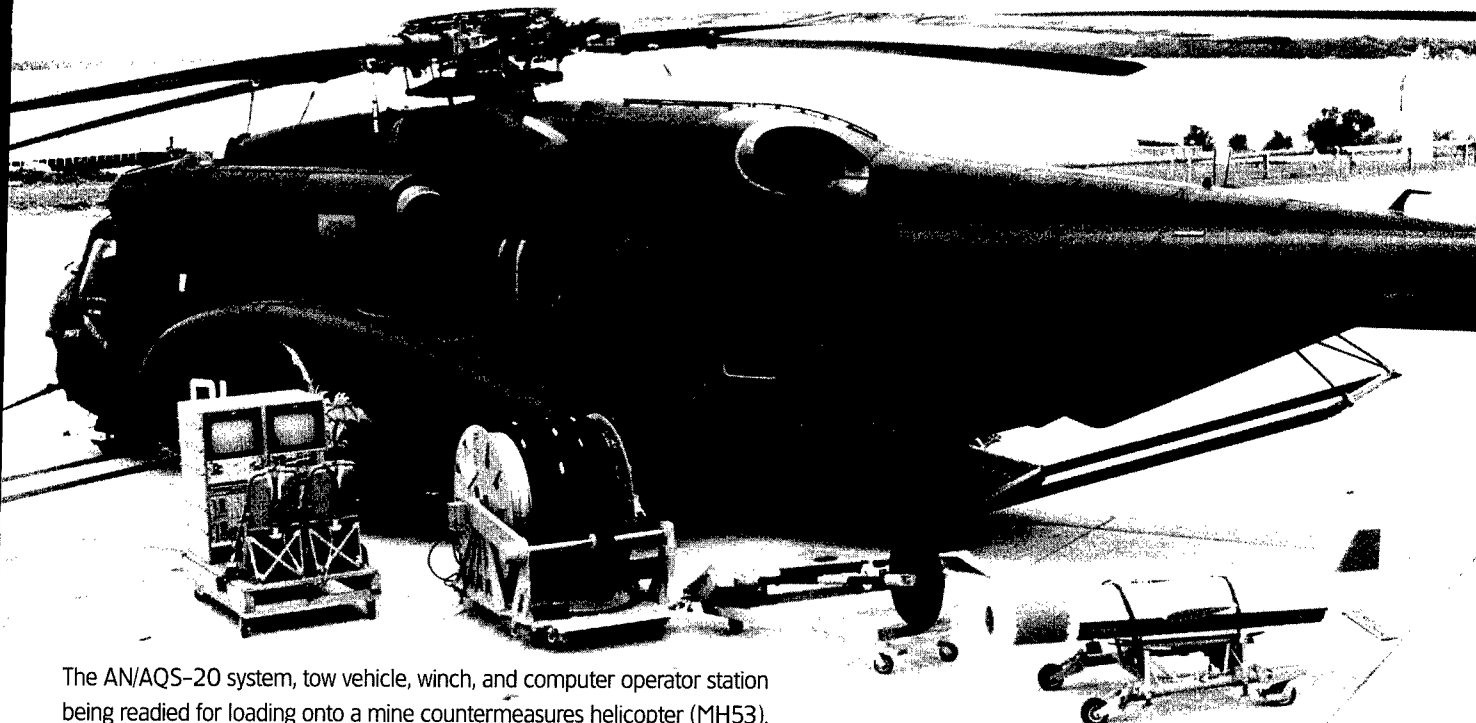
ment practices in mind; but again, using common sense we learned what was successful as we went along.

To more easily understand these managerial lessons learned, we placed them in context, describing the program in chronological order, with perspectives from both the government and industry.

The Proposal Process

In April of 1995, the Office of Naval Research (ONR) received a proposal from Arete Associates to develop a laser-based device for detection and identification of sea mines from a variety of platforms.

Jacobson is a Program Officer at the Office of Naval Research, Arlington, Va. McLean is Vice-President of Arete Associates, Tucson, Ariz. Hunt is an Assistant Program Manager in the Airborne Mine Defense Program Office (PMS-210), Program Executive Office Mine and Undersea Warfare, Arlington, Va. He is a graduate of APMC 98-1, DSMC. Hulgan is a Project Engineer, Coastal Systems Station, Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Va.



The AN/AQS-20 system, tow vehicle, winch, and computer operator station being readied for loading onto a mine countermeasures helicopter (MH53).

ONR's basic mission is to develop Science and Technology for the Department of the Navy, determine its technical merit, risk, and feasibility for future naval applications, and if successful, "transition" the technology to the Acquisition side of the Research and Development portion of the Navy. ONR has three basic categories of funds: 6.1 or basic research, 6.2 or applied research, and 6.3, advanced technology development.

Based upon the submitted proposal, ONR determined that the basic technology using Streak Tube Imaging Lidar (STIL — developed for medical and nuclear blast monitoring) offered some promising technology to the mine countermeasures programs. STIL technology offered the advantages of Commercial Off-the-Shelf (COTS) technology with no moving parts, both of which are attractive in terms of life cycle or total ownership costs.

The original proposal was based upon Arete discussions with various Navy offices, which resulted in a proposed effort that was extremely ambitious in terms of scope and schedule (full system development within two years). Further, the application proposed by Arete

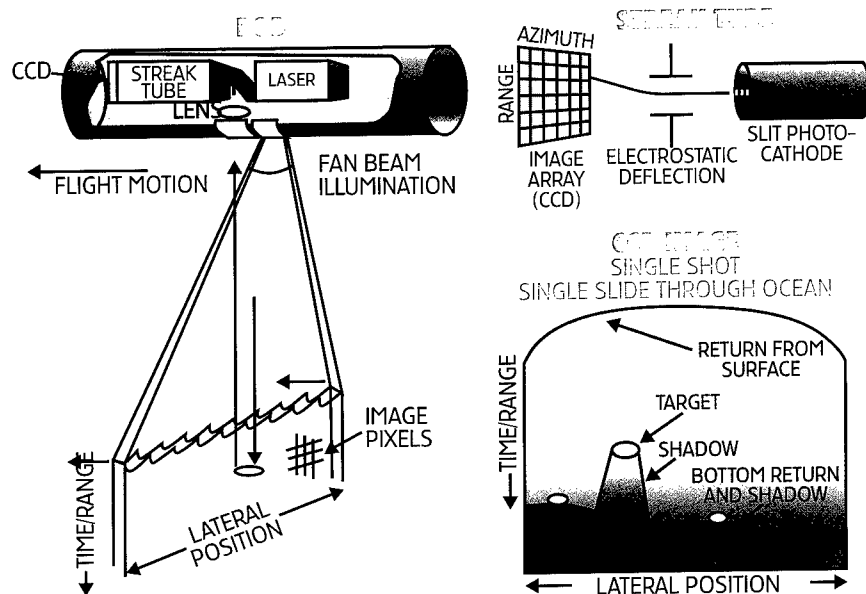
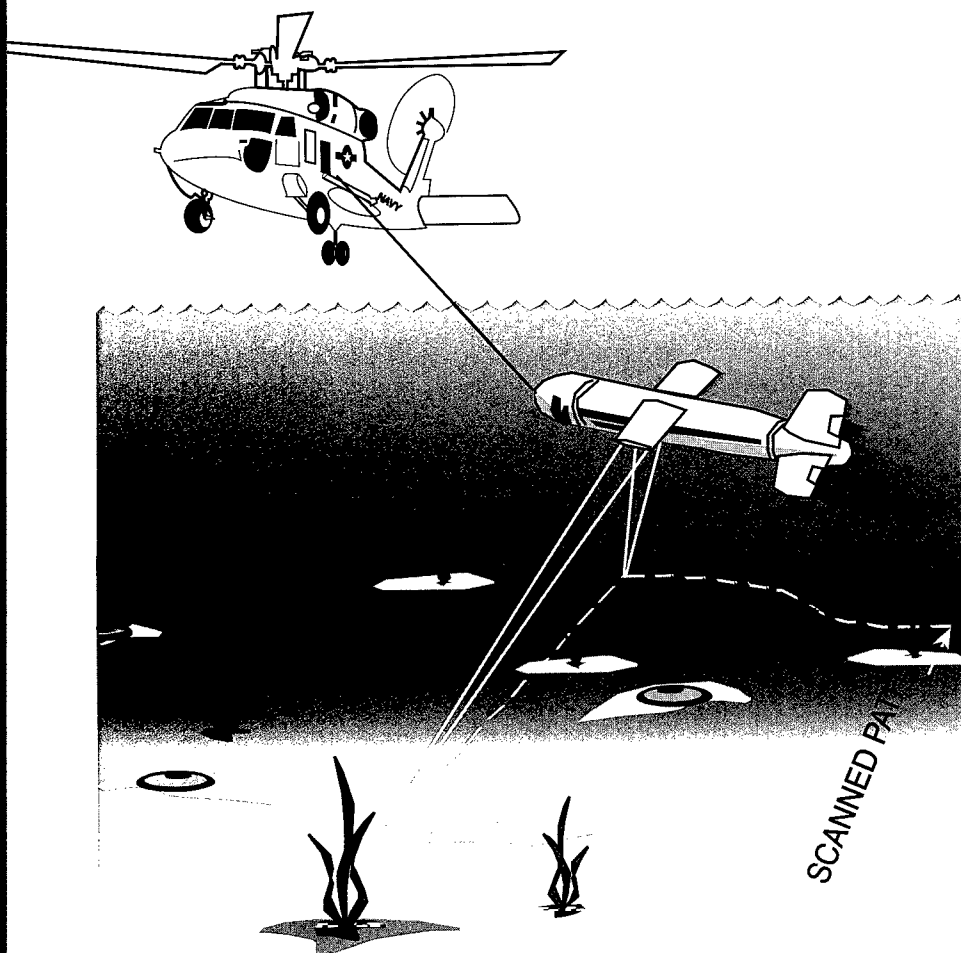
was to place the STIL on an airborne platform for minefield detection. ONR felt that the schedule involved too much risk, and combined with an aggressive budget was inconsistent with ONR's investment strategy at the time.

At that time there existed two airborne minefield detection systems being developed at the direction of Congress. Since the proposal did include other possible applications, including underwater mine identification from a towed platform or unmanned underwater vehicle, ONR entered into discussions with Arete to shift the scope of the program toward this underwater mine identification problem. The emphasis of this revision was toward a demonstration of technical feasibility more appropriate to 6.2 efforts. (The schematic diagram on the next page shows how airborne mine identification operations would be conducted. The lower half of the diagram contains generalized information on how the STIL works.)

Following these discussions, a basic work statement was agreed upon for a one-year contract and a follow-on two-year effort as an option, contingent upon reasonable progress performed in the first

year. Since the funds available to ONR at this time were "one-time" funds, ONR had no assurance that sufficient funds would be available in the out-years. From ONR's perspective, this approach offered realistic expectations and requirements for Arete, who appeared to be enthusiastic about the revised approach although somewhat disappointed at the slower rate of progress than originally proposed.

Negotiation of a Statement of Work (SOW) between the performer and the program manager involves more than the work proposed: schedule, funding, and the manner of contract implementation play a role as well. A gentlemen's agreement was reached to minimize Contract Data Requirements List (CDRL) items to reduce costs, and to allow a certain amount of "contingency funds" for unanticipated problems or issues that might arise during the course of the project. ONR offered a less aggressive management style if Arete could stay within budget and perform on schedule. Without knowing it at the time, ONR and Arete had agreed to a Firm Fixed Price contract with our gentlemen's agreement. Once all sides had agreed to these "conditions,"



STIL (Side-Scan Target Identification and Location) System

the Cost Plus Fixed Fee contract was officially awarded Dec. 8, 1995.

LESSONS LEARNED

- Start with good technology or a product that has utility for improving fleet operations.

- Balance technical milestones and requirements against realistic schedules and budgets.

Program Review

Close to a year later, a program review was held at Arete's facilities in Tucson,

Ariz. Various government representatives with lidar and optical knowledge were invited to review the progress and quality of the effort to date. The professionalism and candor exhibited at the review solidified the trust and respect that had been developing between the sponsor (ONR) and performer (Arete). Attendance by representatives from the mine warfare community at Coastal Systems Station provided critical and timely feedback on the mission needs and program timelines. The review went well, and everyone concurred that significant progress was being made and future efforts were warranted.

Based upon this program review of the first year's efforts, ONR decided to fund the two-year option, providing all of the funds at one time, thereby permitting Arete even more flexibility to accomplish its goals. This stable funding enabled the company to commit both experienced personnel and capital facilities for an extended period, resulting in rapid progress toward a challenging technical objective. This turned out to be a win-win proposition for the program.

LESSONS LEARNED

- Provide stable funding with clear expectations.
- If agreements are made beyond the actual contract, make sure that they are met.

Transition

A few months later, the Navy announced a call for proposals for Advanced Technology Demonstrations. These ATDs are for 6.3-level efforts and are reviewed by a wide range of naval personnel, from ONR to Resource Sponsors to Acquisition Managers. Arete Associates submitted two ATDs for the STIL technology: one for underwater mine identification and another for airborne mine-field detection. Both proposals made the final submission list, but the Navy ultimately deemed another mine warfare proposal to be of higher priority. Nevertheless, a wide skills mix of naval personnel were exposed to the advantages of STIL technology, and the proposal presentations did a lot of good for promoting what had already been done by Arete.

Meanwhile, the Navy demonstrated a separately sponsored ONR program for mine identification in a Fleet exercise; and the capability for identifying mines in stride and in real-time proved to be a major paradigm shift in possible tactics for mine countermeasures. The technology demonstrated was more mature than STIL, and it was quite different in design but offered similar capabilities. As stated earlier, ONR's mission is to provide state-of-the-art technology solutions that offer significant improvement in capability and lower cost to the Acquisition managers. But, it goes far beyond that: we should also offer them alternatives or options to evaluate, i.e., competition and risk reduction.

Overall, ONR believed that the progress for STIL was good, the external pressure for mine identification was growing, and that it was time to budget for a follow-on program for STIL in the 6.3 arena. Since it takes two years to prepare for 6.3 project funding in the congressional budget requests, the time was propitious. Further, there were two separate opportunities for "transition" into Acquisition programs in the Fiscal Year 2001/2002 time frame: the airborne towed subsurface mine hunting system, AN/AQS-20, and the surface deployed semi-submersible, Remote Minehunting System, now designated AN/WLD-1.

LESSON LEARNED

- *Prepare for transition early in the development cycle, including developing visibility and credibility with the user community.*

Integrated Product Team

The second annual review of STIL was also held in Tucson at Arete's offices. Representatives from OPNAV N85 (Expeditionary Warfare) and the Program Executive Office (Mine and Undersea Warfare), or PEO (MUW) attended. Again, the review went exceptionally well, and the information presented, both technical and managerial, was provided in a form that everyone could understand. By this time, the sponsor, performers, and user community were, in essence, functioning as an integrated team working toward a common objec-

Negotiation of a Statement of Work (SOW) between the performer and the program manager involves more than the work proposed: schedule, funding, and the manner of contract implementation play a role as well.

tive and purpose. The meeting was simultaneously rigorous in content, while informal in atmosphere. Such an atmosphere facilitated frank discussions of technical maturity, mission needs, and programmatic milestones. Informal discussions continued into the evening over dinner, providing a forum for informal one-on-one discussions.

By the third year of the 6.2 program, it was clear that STIL technology had many benefits for mine warfare, and that the technical risks were reasonably small. At this point, the Navy reached concurrence for the follow-on 6.3 program. ONR asked Arete Associates for a formal

proposal, based upon the previous ATD proposal, to integrate the STIL technology into a towed body matching the form, fit, and function of the AQS-20 system. Since Arete Associates patented the STIL technology for mine countermeasures, ONR sole-sourced the contract.

A formal Integrated Product Team (IPT) was developed between PMS-210 (the airborne mine countermeasures portion of PEO(MUW), Coastal Systems Station, N85, ONR, and Arete Associates. In addition, a draft memorandum of roles and responsibilities of the IPT was circulated, and all parties concurred with the IPT structure. ONR would retain the lead for funding and technical oversight, PMS-210 would be the execution agent, CSS the technical agent for interfacing with Navy assets, and Arete would be the main performer.

Seeking input from all parties involved, ONR forwarded Arete's proposal to the IPT members for comments. In August 1997, representatives from Arete, ONR, PMS-210, and CSS met in Washington to agree to the proposal's SOW, schedule, and budget. This meeting was significant in that the IPT agreed upon not only Arete's budget, but also the budgets for PMS-210 and CSS. The ground rules agreed to by all sides were three-fold:

- The budget would be guaranteed across the three years.
- Minimal documentation would be required.
- There would be no dramatically aggressive management unless required, in exchange for no cost growths and a performance on schedule.

Various other options were also included in the proposal in the event extra funds were made available to ONR. Upon unanimous consensus by all IPT members, ONR submitted the proposal to ONR's Acquisition Department for contract negotiation.

LESSONS LEARNED

- *Balance technical milestones and requirements against realistic schedules and budgets.*

- *Provide stable funding with clear expectations.*
- *IPTs do work, given a clear understanding of the rules and responsibilities of all involved.*

Contract Award

The Navy awarded the contract for the 6.3 program in December 1998 and held a kick-off meeting the following day in Tucson. This was the first meeting at which all four authors of this article were assembled together. The informal atmosphere again prevailed, reflecting the community spirit and common purpose of the group. A number of working group meetings between Arete Associates and CSS personnel had been ongoing since the beginning of the 6.2 program, and by this time a Navy/industry true team had developed.

Moreover, expertise at Arete and CSS proved to be entirely complementary, resulting in a very harmonious working group. CSS provided detailed knowledge of mine warfare and the AQS-20 capabilities and requirements, and was primarily responsible for vehicle integration and test operations, with Arete responsible for the electro-optic sensor technology.

One of the most challenging aspects involved was incorporating the sensor package into the very limited space available; close working relationships between CSS, Arete, and sub-contractor Metro Engineering helped simplify an otherwise daunting task. Progress was sure and swift, with no major problems developing. Within these working groups, team members worked hard to ensure a smooth-running program, and once again, the strong spirit of teamwork contributed to this effort.

A Preliminary Design Review and Critical Design Review were held over the next few months. These meetings were moved from Arete's Tucson offices to larger facilities at a nearby hotel, where the conference room and lodgings could be co-located. This arrangement allowed discussions to continue after the formal presentations and reinforced the team atmosphere.

Serendipitously, the ONR and Arete program managers discovered many mutual interests outside of the project, including hiking, where the desert served as a backdrop for discussion on a wide range of issues inappropriate for discussion during the more formal reviews, such as finance, programmatic balance, and personnel issues. Discussions of this nature proved crucial in cementing the mutual respect and trust between performer and sponsor.

Arete raised a concern regarding the transition window of opportunity for the RMS and AQS-20 programs. Each program's projected schedule was changing rapidly, sometimes being foreshortened; other times stretched out. For those not intimately involved in the details, the actual dates for selection of the Electro-Optic ID portion of these efforts seemed a moving target. Some on the IPT wanted to accelerate the STIL program to match the current AQS-20 program schedule.

By now, a variety of EOID components for RMS, AQS-20, and AN/AQS-14A (the existing Fleet helicopter towed sonar system) were envisioned, all with different selection dates. Eventually, ONR recommended keeping the original STIL schedule, since most DoD program schedules remain in flux until the last minute, and chasing a moving target would expend resources unnecessarily. The philosophy was to mature the STIL technology at an appropriate pace, and let the chips fall where they may. While taking a risk of missing a schedule for transition, it seemed a prudent approach to take. Since that decision, the AQS-14A selected a COTS laser line scan system for a Deployment Contingency Program of four units, and the RMS program chose to incorporate the AQS-20 sensors and towed body to save costs to the government.

Further, the AQS-20 program was renamed as the AN/AQS-20/X to reflect the addition of the EOID sensor. The merger of RMS and AQS-20/X sensor/tow body configuration had the effect of moving the selection date of the EOID sensor up by about six months.

As the Navy was set to conduct a number of interim test demonstrations of STIL prior to this selection date, the team believed that there was still no need to accelerate the STIL schedule.

LESSON LEARNED

- *Balance technical milestones and requirements against realistic schedules and budgets.*

Testing

Two interim risk-reducing tests were originally scheduled using the same hardware, in a slightly more convenient packaging, for testing of glass bottom boats. The first test collected data, but it proved hard to correct and place the data into appropriate images due to the rolling of the boat and the failure of the Inertial Measurement Unit. The second test was delayed due to poor water clarity, but was finally undertaken in May 1999 in the waters around Panama City, Fla. The water clarity was again very poor; some data was collected, but the results were not particularly pleasing for demonstration of the system's capabilities to those not intimately familiar with ocean optics.

Because of the poor test conditions, the IPT decided that one additional test should be performed where clear waters were virtually guaranteed to prove the resolution and performance of the STIL system in optimal conditions. The team selected Nassau, Bahamas, as the site because of its clear waters. Upon approval of the site selection, the team shipped their equipment to Nassau and chartered a glass bottom boat, only to be met by Hurricane Floyd, which forced an emergency evacuation of all personnel. Rescheduling the test for the following week, team members finally succeeded in collecting a large set of data—all of excellent quality.

While this final extra test was not budgeted, the IPT agreed that: 1) it was important to collect the data, and 2) ONR funds should be allocated for that purpose. Because the team conducted the unanticipated extra test at the end of the fiscal year, ONR did provide the extra funds after the experiment and covered

the extra costs at Arete and CSS. Results of the interim testing, as well as the sensor integration efforts, were subsequently reviewed in Tucson during periodic Interim Progress Reviews (approximately quarterly).

LESSONS LEARNED

- *If agreements are made beyond the actual contract, make sure that they are met.*
- *IPTs do work, given a clear understanding of the roles and responsibilities of all involved.*

Five Years Later

During 1999, the Navy solicited two Requests for Proposals for mine hunting sensors for: 1) an airborne version for minefield detection by PMS-210; and 2) an underwater EOID for the AQS-20/X by Raytheon, the prime contractor for the AQS-20 system under sponsorship of PMS-210. While the STIL system had not been funded for the airborne detection system by ONR, its basic technology could easily be adapted for that purpose. In fact, Arete Associates spent independent research and development funds to demonstrate its capability to detect subsurface mines, and had a contract with the Australian government using airborne STIL for determining bluefin tuna fish stocks. Each of these programs used the system built under ONR sponsorship in the 6.2 program.

In addition, Arete teamed with another industrial partner and submitted a proposal for the airborne laser mine detection system. This Request for Proposal for an airborne mine detection system was the same concept that Arete originally presented to ONR for funding in 1995. In taking the modular technology approach, the advantage for Arete and the government was that it allowed the company flexibility to respond to a variety of Acquisition programs, rather than a single transition opportunity.

The other RFP from Raytheon was for the underwater mine identification subsystem, and required a much shorter turnaround time for proposal preparation and selection for award. The government received two proposals and

Trust and respect for each member of the program is absolutely imperative. This is perhaps one of the hardest things to quantify, measure, or implement; but without it, the program will likely not succeed.

after careful consideration, chose Arete Associates' STIL technology due to the technical and packaging maturity, the lack of moving parts, and the ability to collect three-dimensional data. Thus, within five years of starting the STIL program, ONR successfully transitioned the hardware, design, and personnel involved from a Science and Technology Program into an Acquisition Program under PEO(MUW)'s cognizance. Further, the Airborne Laser Mine Detection System was awarded to the combined team of Northrop Grumman and Arete Associates, fulfilling the original goals of Arete when they first submitted their proposal to ONR.

Principles for Successful Program Management

Based upon our experiences in this program, we offer the following seven principles for successful management based on, once again, common sense and practical management.

Start with good technology or a product that has utility for improving Fleet operations. It can either be a new capability, an improvement to an existing one, or an equivalent capability that lowers maintenance or life cycle costs. Without the quality product, the program will not transition to Acquisition. Quality performance by industry and laboratories is essential to see the product through to completion on time and within budget.

Balance technical milestones and requirements against realistic schedules and budgets. Most programs can't afford large investments on short lead times, particularly with very ambitious goals, aggressive schedules, and concomitant risks. A more modest program, designed to reduce risk in stages, is often more affordable and allows time for proper maturity. Technology needs to be matured at a natural, intrinsic pace, and acceleration of this pace only creates problems that additional funds usually cannot remedy. Similarly, transition windows should not be chased needlessly by accelerating a program more than it can accommodate. Most acquisition program schedules slip until the very end, and if the project schedule is reasonable in the first place, the team can accomplish more by proceeding at their own natural pace.

Prepare for transition early in the development cycle, including developing visibility and credibility with the user community. It typically takes two years of preparation to program a new project into the 6.3 or 6.4 category of funds, with a lot of maneuvering and paperwork done in the background. Industry, in particular, often does not realize this and becomes discouraged by the seemingly slow pace of DoD program planning, and then resorts to external pressures or influences.

IPTs do work, given a clear understanding of the roles and responsibilities of all involved. The roles were assigned to be entirely complementary between organizations, which minimized conflicts and reinforced our common goals. This teaming relationship worked so well that any member of the IPT could speak for another since we all shared a common vision for the project and program.

Provide stable funding with clear expectations. In STIL's case, the team cultivated, continued, and reinforced mutual trust and respect from start-up of the original budget/SOW negotiation throughout program execution. ONR provided stable funding at all times and expected work to be completed on time and on budget. Funding and scheduling stability is often hard to achieve, but for this challenging program it has allowed performers to dedicate personnel and facilities to ensure continued success.

If agreements are made beyond the actual contract, make sure that they are met. Guarantees, if made, should be for those aspects that can be actually controlled, such as stable funding, CDRL require-

ments, etc. In our case, a guaranteed transition to an Acquisition program was never an option — only that we, as a team, would do everything possible to provide the opportunity to compete. If a specific commitment cannot be guaranteed, that commitment should not be offered or made under any circumstances.

It's the people, stupid! Trust and respect for each member of the program is absolutely imperative. This is perhaps one of the hardest things to quantify, measure, or implement; but without it, the program will likely not succeed. If the product is great, but the people don't trust one another, the program will likely fail. Given the right mix of personnel, success is more likely to be achieved. Supervising managers may want to consider mixing and matching people to enable development of a good rapport. This can be achieved by knowing the strengths and weaknesses of the individuals involved — both technical and personal — and determining the best mix of personalities to achieve results. In our case, the rapport between people developed spontaneously.

Let Common Sense Rule

We all know all of these things intuitively, but it is easy to overlook any one of them. And this oversight could very well lead to the failure of even the greatest of ideas. For these authors, the ability to see this project through from technology development to insertion into two active acquisition programs was a rewarding achievement, but it was only possible because we allowed our common sense to rule. Starting with a good technology that had real application, we framed the development cycle in realistic terms; instilled a focus on the issues that would arise from future transitions and tackled them early (including Fleet participation); maintained a strong common vision; understood the expectations of all concerned; and put together a team that made the most of what each had to offer. And the result? A successful program, of course.

Editor's Note: The authors welcome questions or comments on this article. Contact Jacobson at jacobsr@onr.navy.mil, McLean at jmclean@arete-az.com, Hunt at HuntSG@navsea.navy.mil, and Hulan at hulganmc@ncsc.navy.mil.

Defense Awards Given for Competitive Research

Deputy Under Secretary of Defense for Science and Technology Delores M. Etter announced today [Feb. 16, 2000] plans for the Department of Defense (DoD) to award \$24 million to 35 academic institutions in 18 states, including Puerto Rico, to perform research in science and engineering fields important to national defense. Eighty-one projects were competitively selected under the fiscal 2000 Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The DEPSCoR is designed to expand research opportunities in states that have traditionally received the least funding in federal support for university research. The average award will be approximately \$296,000.

University professors in Alabama, Alaska, Arkansas, Idaho, Kansas, Kentucky, Maine, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, South Dakota, Vermont, West Virginia, Wyoming, and the Commonwealth of Puerto Rico were eligible to

receive awards under the Defense Experimental Program to Stimulate Competitive Research competition.

The Air Force Office of Scientific Research, the Army Research Office, the Office of Naval Research, and the Ballistic Missile Defense Organization (Science and Technology Directorate) solicited proposals utilizing a Defense-wide Broad Agency Announcement (BAA). The DEPSCoR BAA was published on the Internet and accessed by the Experimental Program to Stimulate Competitive Research State Committees, which solicited and selected projects for their state's proposal. In response, 20 proposals consisting of 256 projects were submitted requesting more than \$82 million.

Editor's Note: This information, published by the Office of the Assistant Secretary of Defense (Public Affairs), is in the public domain at <http://www.defenselink.mil/news> on the Internet.

DoD Adapts Off-the-Shelf Technology

LINDA D. KOZARYN

WASHINGTON — Mix a little new commercial technology into an existing weapon system and the result could be military equipment that's more efficient and less costly to operate.

DoD and corporate America are adapting off-the-shelf technology to improve military planes, helicopters, and other weapon systems. DoD's Commercial Operations and Support Savings Initiative, or COSSI, provides seed money so civilian industry can insert technology into what are known as "legacy" systems.

The DoD initiative leverages private-sector research and development to reduce operations and support costs, according to Rich Mirsky, who heads COSSI at DoD's defense research and engineering office here. The program also promotes civil and military integration and supports acquisition reform, he said.

COSSI is a two-stage process. First, DoD funds the nonrecurring engineering, testing, and qualification needed to adapt a commercial item for military use. Then, selected contractors develop, manufacture, and deliver prototypes to military customers for installation into fielded DoD systems.

Since 1997, DoD has invested about \$160 million on nearly 60 projects while more than 100 private industry contractors invested \$117 million. Defense officials estimate the projects will result in \$4 billion in operation and support cost savings over a 12-year period.

One project, for example, involves adapting a commercial health and usage monitoring system for use in military helicopters. Mirsky said the adapted system would help identify problems quicker and reduce flight tests. The system will create a database by collecting information automatically. It will also

allow maintenance personnel to replace parts based on condition rather than time in service, he noted.

Another project involves adapting propellers on Navy P-3 aircraft to switch to an electronic system from an electromechanical one. Propeller maintenance costs are expected to drop from over \$20 per flight to less than \$4 per flight.

Defense officials also are working on adapting the flight computer used on the Sikorsky S-92 commuter helicopter for use in the military's UH-60. "Your maintenance costs go way down," Mirsky said. "Your reliability goes way up. It weighs less and uses less power."

New communications systems components for C-17 transports, processors, and software for F/A-18C/D fighters, electronic display units for F-16 fighters, and other projects will reduce parts obsolescence as well as spare parts and software maintenance costs. They will also reduce unnecessary replacements, testing time, and effort, Mirsky said.

He said DoD solicits proposals from contractors, and the Services, then evaluates and ranks the proposals. The fiscal 2001 budget request includes \$51.9 million for the initiative — \$9.9 million for the Army, \$12.5 million for the Navy, \$19.9 million for the Air Force, and \$9.6 million for the Office of the Secretary of Defense.

For more information about COSSI, visit www.acq.osd.mil/es/dut on the Web.

Editor's Note: Kozaryn works for the American Forces Press Service. This information is in the public domain at www.defenselink.mil/news on the World Wide Web.

Cohen Reports to Vice President

Secretary of Defense William S. Cohen reported to the Vice President Feb. 18 on DoD's progress toward achieving Year 2000 Acquisition Goals. The report, third in a series of six semiannual reports, was written in plain language to provide the American public a clear picture of progress in reinventing Defense Acquisition.

In his third report, Cohen outlined the Department's three-year goals, actions taken, and progress to date. The three-year goals were founded on the objectives of *Delivering Great Service*, *Fostering Partnership*, and *Internal Reinvention* that the Administration set forth in the Blair House Papers. Cohen's report reflected a Department that is moving forward.

"As we stand now, at the mid-point of our efforts to attain our Year 2000 Goals, I am pleased to report that the Department has already met, or met and surpassed, nine of its 16 goals. The majority of the remaining goals are ahead of schedule and are expected to exceed the performance set in the original goals."

This excerpt from the report presents only the three-year goals and actions taken. To read about how DoD measured its progress to date, download the entire report at <http://www.acq.osd.mil/ar/vpreport8-99/mainmenu.htm>.

Delivering Great Service

We are becoming a world-class service provider! We are delivering weapons quicker than before. We are supplying our warfighters and peacekeepers better, cheaper, and faster. We are cutting

bureaucratic red tape by using Government Purchase Cards for small purchases. And we are enhancing our skills by providing our DoD acquisition-related workforce knowledge, tools, and techniques through continuing education.

Deliver new major defense systems to the users in 25 percent less time.

In the past, we were more concerned with focusing on performance than about how long it took to field systems. During the Cold War era, the threat environment was stable and predictable, and thus program schedule received much less emphasis than system cost and performance.

We must buy our systems faster and field them sooner. The Cold War is over, and



the threat environment is now unstable and constantly changing. Therefore, we need to be more flexible and responsive in meeting the needs of our warfighters by fielding new systems in much less time. We expect that shorter cycle time will reduce cost growth and accelerate our modernization efforts.

Our goal is to reduce the cycle time of new programs (i.e., the time between starting a new program and achieving initial delivery) by 25 percent. That means the average cycle time of new programs, which started since 1992, will be less than 99 months by the end of the year 2000—a 25-percent reduction from the recent historical average of 132 months.*

**Based on average cycle time of currently active programs started prior to 1992.*

TAKING ACTION

Since 1992, we have employed acquisition reform, such as the use of commercial items and the latest computer technologies in the design, manufacturing, and management of our programs.

They have helped us in reducing cycle time, but we plan to do much more in order to reduce cycle time by at least 25 percent. Therefore, we will:

- use shorter cycle time as a planning constraint in structuring new programs;
- strictly enforce shorter cycle time in approving new programs; and
- closely monitor programs in the process of acquiring, programming, and budgeting to limit cycle time growth.

In addition, we are changing the way we manage our programs to achieve shorter cycle time. Specifically, we are emphasizing the urgency of near-time requirements and the availability of proven technologies as key criteria in authorizing new programs. This means that we can now satisfy warfighter needs *incrementally*—by infusing new technologies as they become available with each subsequent delivery.

With our focus on improving asset visibility, we are providing direct access to timely, accurate information on the status, location, and movement of units, personnel, equipment, and supplies.

Better Logistic Supply Services

OUR THREE-YEAR GOAL

To achieve visibility of 90 percent of DoD materiel assets while resupplying military peacekeepers and warfighters and reducing average order-to-receipt time by 50 percent.

Our primary job is to supply our customer—the warfighters—with the products they need, when they need them. Today, this job is not being done as effectively as world-class companies, which respond far more quickly to customer orders than we do.

TAKING ACTION

Better Logistic Supply Services are first and foremost about gathering and using information about our inventories far more effectively than before. To this end, we will integrate our existing information systems better and build new information systems when necessary.

With our focus on improving asset visibility, we are providing direct access to

timely, accurate information on the status, location, and movement of units, personnel, equipment, and supplies. By November 2000, we will also have the ability to redistribute inventories on time to where they are needed most.

We will also use information systems to reduce delivery times by relying on electronic, rather than paper, transactions with our vendors. We will further reduce delivery times by using commercial practices, such as contracting with vendors to provide direct support, and using faster transportation services to respond more quickly to customer orders. All of these steps will enable us to meet our customers' needs more rapidly, improving military readiness, while reducing inventory and delivery costs.

Similarly, we will encourage our vendors to process our orders quicker by adopting flexible manufacturing practices.

Simplify Buying of Goods and Services

OUR THREE-YEAR GOAL

Simplify purchasing and payment through use of purchase card transactions for 90 percent of all DoD micropurchases while reengineering the processes for requisitioning, funding, and ordering.

When we buy a product for less than \$2,500, we call it a micropurchase. In the past, we treated micropurchases like all other purchases. When we wanted to order an inexpensive product, we used a form that required lots of review and approval. Needless to say, this bureaucratic work added significantly to the real cost of the product and to the time it took to receive the order.

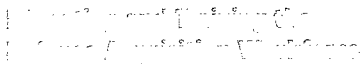
Today, we don't use this inefficient process. Instead, we use the Government Purchase Card in much the same way the public uses commercial bank credit cards to purchase items. Our *Simplify Buying of Goods and Services* goal is to increase our use of the Government Purchase Card for micropurchases, while making our ordering and buying processes more efficient and cost effective.

The Army estimates that it saves \$92 per transaction when supplies or services are bought with the Government Purchase Card. It just makes more sense to spend this money helping our warfighters, rather than on unproductive paperwork.

TAKING ACTION

We are continuing to remove bureaucratic roadblocks to using Government Purchase Cards for micropurchases except in a few special cases. We are working to limit these special cases to a bare minimum.

We are also reorganizing our traditional requisition and ordering system to match these new conditions. In 1997 alone, we used the Government Purchase Card for 5 million contracting micropurchases. In 1998, we increased that to over 7 million.



OUR THREE-YEAR GOAL

Create a world-class learning organization by offering 40 or more hours annually of continuing education and training to the DoD acquisition-related workforce.

In the last few years, we have undergone dramatic changes in how we buy goods and services. We made these changes to facilitate better, cheaper, and faster support to the warfighters.

Many of these changes are based on best commercial practices. These practices are often very different from the way we performed our jobs in the past.

We offer quality education and training to help our buyers adjust to this new environment. This education and training includes not only a description of the new practices, but also an understanding of why these changes are being made.

To become a better acquisition workforce, we must continue our training throughout our careers to ensure that we stay current with best commercial and government practices. Only by continuing our education can we avoid

creating a new system as rigid as the old.

TAKING ACTION

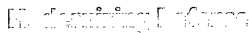
We plan to meet our three-year goal of *Educating the Defense Acquisition Workforce* by having our people take a mandatory 40 hours of continuing education annually, or 80 hours over two years.

In the near term, most of this training will take place in traditional classrooms. We are, however, rapidly expanding our use of computing and telecommunications technology to provide more cost-effective and timely training via satellite and the interactive environment of the Internet.

Our acquisition workforce also now takes training in other fields to expand their expertise and certifications. This opportunity will make them better rounded in their daily duties, as well as enhance their job satisfaction.

Fostering Partnership

We are reducing our costs by working more closely with our customers, the warfighters, and our local communities! We are using the savings to buy modern weapons. We are turning over land we don't need to local communities and getting out of the landlord business. We are using computers to eliminate excessive and time-consuming paper transactions. We are ever mindful of our environmental trust, and we are improving where we live and work by reducing the release of toxic chemicals.



OUR THREE-YEAR GOAL

With no top-line budget change, achieve annual defense procurement of at least \$54 billion toward a goal of \$60 billion in 2001.

After the Cold War, we decreased defense spending dramatically. This reduction was particularly significant in the buying of new weapons and equipment.

At the time, this made sense because our inventory of newer weapons was sufficient to meet the needs of our reduced

troop levels. Older weapons and equipment were retired.

Over the intervening years, we further reduced our budget for buying new weapons by spending on unplanned events, such as regional conflicts, peacekeeping, and humanitarian missions.

Today, our defense inventory is showing its age with much now needing to be replaced. As the level of technology used by our potential adversaries increases, we need to continue fielding new weapons and equipment to maintain our military edge.

To meet our goal of *Modernizing Defense*, we will increase our annual budget for new weapons and equipment to at least \$54 billion in the year 2000 and \$60 billion by the year 2001. This represents an increase of almost \$10 billion over the 1997 budget.

TAKING ACTION

We increased procurement funding by fully implementing the recommendations of our Quadrennial Defense Review and continuing with the Defense Reform Initiative. These senior-level reviews lead us to free more money for buying new weapons and equipment by:

- better planning for operating and support costs;
- further cutting our troop levels;
- reforming our business practices; and
- streamlining our acquisition and logistics workforce.

Due to an emergent need to address near-term readiness concerns, the Department was only able to budget \$53 billion for procurement in the year 2000, which is just short of the goal. The Department is on target, however, toward achieving its \$60 billion goal (\$61.8 billion is budgeted) in procurement funding in 2001.

Despite this shortfall, this goal has been a success story. The Department made great strides in reducing cost growth in the operations and maintenance accounts that causes the migration of funds from investment accounts. Over the pre-

ceding years, the Department has consistently increased procurement funding such that we can begin modernization of our operating forces. During the goal time frame (1997-2000), procurement funding has experienced a real growth of 15 percent.

Partnering With Communities

OUR THREE-YEAR GOAL

In the spirit of fostering partnerships and community solutions, DoD will complete disposal of 50 percent of the surplus property baseline and privatize 30,000 housing units.

We are the nation's largest landlord. We own hundreds of military facilities and thousands of apartments and houses in the United States. Today, we are getting rid of land we no longer need and are inviting private companies to build and operate our housing units. These actions will save money and rebuild our local and base communities, while improving the quality of life for our troops.

On the recommendation of the bipartisan Base Realignment and Closure Commissions (1988 - 1995), we are closing 97 major military bases and restructuring 55 major bases. We have already saved \$14 billion from these and related actions.

We are working closely with local communities to minimize the negative consequences of these closures. We are providing communities with technical assistance and grants to help them convert these properties to sources of new jobs.

We also currently own about 300,000 family apartments and homes in the United States. More than 60 percent of these properties need to be renovated or replaced. We have invited the real estate industry to apply commercial practices to improve these properties and help us in saving the taxpayer some of the \$20 billion these repairs would have traditionally cost.

TAKING ACTION

Selling, leasing, and transferring government real estate isn't easy. We have

**By partnering with
our local
communities, we
are reusing excess
government
property more
efficiently,
redeveloping closed
bases as centers
for job creation and
community
activities, and
producing cost
savings that can be
put back into force
modernization and
readiness.**

overcome numerous legal, financial, and environmental hurdles to achieve our goal of *Partnering With Communities*. By partnering with our local communities, we are reusing excess government property more efficiently, redeveloping closed bases as centers for job creation and community activities, and producing cost savings that can be put back into force modernization and readiness.

We are continuing to work with Congress to write new laws to ease this task in the future. We regularly review past property transfers to make sure they worked out right. Moreover, we are reaching out to local communities to hear their concerns as we strive to reach this goal in partnership.

Decreasing Paper Transactions

OUR THREE-YEAR GOAL

Decrease paper transactions by 50 percent through Electronic Commerce and Electronic Data Interchange (EC/EDI).

Industry is rapidly moving away from paper-based business practices toward electronic commerce and electronic data interchange. While we have made some progress in this area, we are lagging behind industry.

To make up for lost time, we are:

- setting up computer networks for all our people;
- removing regulations and other barriers to exchanging information electronically; and
- improving our business practices to take advantage of information technology advancements.

The goal of *Decreasing Paper Transactions* is to accelerate our transition from paper to electronic transactions. This will cut down our paperwork and that required of companies doing business with us. Paperless transactions will improve efficiency and effectiveness, and reduce processing times and costs, while providing more timely insight.

TAKING ACTION

Filling out paperwork required to do business with us can be burdensome. Too many forms, redundant questions, and requests for unnecessary information are leading reasons for some of the frustrations we feel.

The goal of *Decreasing Paper Transactions* is to:

- limit paperwork;
- provide timely payments;
- minimize repeated requests for the same information;
- make DoD information more accessible through electronic media;
- improve data accuracy; and
- make communications with industry easier and faster.

We are continuing on our three-year effort to increase paperless electronic busi-

ness transactions and improve business practices.

To move away from our paper-based system, we are capitalizing on electronic contracting, program management, and logistics support information. By doing this, we will reduce the time and cost to do our job and thereby provide better support to the warfighters.

The business efficiencies of digital transactions will significantly reduce the total costs of owning, operating, and maintaining our weapons and equipment.

We are measuring our progress and studying additional actions to better support our customer and save money.

Reducing Toxic Pollution

OUR THREE-YEAR GOAL

Reduce total releases of toxic chemicals by a further 20 percent.

In 1994, we began to submit annual reports to the Environmental Protection Agency on our usage of a number of toxic chemicals. In 1994, we released or shipped from military bases 10.6 million pounds of these chemicals. In 1995, we reduced these releases and shipments by 36 percent to 6.7 million pounds. We did this by adopting a strong pollution prevention program and reducing polluting activities.

By decreasing these toxic chemicals, we avoid spending money on extra paperwork, special handling, and disposal. Most importantly, we improve the environment for everyone. Our **Reducing Toxic Pollution** goal is to reduce the use of toxic chemicals a further 20 percent.

TAKING ACTION

We are finding new products and processes that do not rely on toxic chemicals and are substituting them where possible.

We are working in partnership with industry to reduce or eliminate toxic chemicals used in manufacturing weapons. We are making it much easier for the defense industry to find alternatives to using toxic chemicals.

We are resizing our workforce to match our workload more efficiently for the 21st century.

Minimizing the use of toxic chemicals in manufacturing weapons also reduces the use of toxic chemicals on military bases that operate, maintain, and repair the weapons.

DoD Internal Reinvention

We are changing the way we do business! We are developing an implementation strategy to better identify our costs to specific outputs. We are selling off unneeded stockpile materials and government-owned property, while cutting our supply inventories to match the current needs of our warfighters and peacekeepers. Moreover, we are controlling cost growth in our major weapons programs. Our stewardship of defense resources is a public trust. We are tightening our belt to have a lean, empowered acquisition workforce and an effective fighting force for the 21st century.

Streamlining Our Workforce

OUR THREE-YEAR GOAL

Eliminate layers of management through streamlined processes while reducing the DoD acquisition-related workforce by 15 percent.

Since 1989, we have reduced our acquisition workforce by over 50 percent. We are Streamlining our organizations further and reducing our acquisition manpower by at least another 15 percent between 1997 and the year 2000. We are resizing our workforce to match our workload more efficiently for the 21st century.

TAKING ACTION

We cannot accept any inefficiency in our acquisition workforce when money for our customer, the warfighter, is tight. We are reengineering our processes, eliminating redundant work, and simplifying procedures. We are giving program teams more responsibility and cutting unnecessary reviews and oversight.

As a result of these changes, we are less bureaucratic and more professional, and we are continuously looking for additional opportunities to do business better, cheaper, and faster with fewer people.

Providing Effective Cost Accounting

OUR THREE-YEAR GOAL

Define requirements and establish an implementation plan for a cost accounting system that provides routine visibility into weapon system life cycle costs through activity-based costing and management. The system must deliver timely, integrated data for management purposes to permit understanding of total weapon costs, provide a basis for estimating costs of future systems, and feed other tools for life cycle cost management.

One of the biggest obstacles we face in controlling and managing the cost of weapons and equipment for their entire useful life is the lack of a common, robust, cost accounting process. Our current systems do not communicate with each other effectively, nor do they add all of the costs of many activities in a manner that is most useful to management. As a result, they give us only limited insight into the total cost of buying, using, maintaining, and disposing of our inventories.

Our **Providing Effective Cost Accounting** goal is to develop a plan for a new, DoD-wide cost accounting process by the year 2000.

TAKING ACTION

We are working closely with outside consultants to assess current cost accounting initiatives. We are talking to our customers throughout the DoD to define common requirements for a new cost accounting process.

Reducing Excess Inventory

OUR THREE-YEAR GOAL

Dispose of \$2.2 billion in excess National Defense Stockpile inventories and \$3 billion of unneeded government property while reducing supply inventory by \$12 billion.

After the end of the Cold War, we found ourselves with a huge inventory of materials and supplies that we no longer needed. By using up, selling, or otherwise disposing of this inventory, we are recovering and reducing costs by billions of dollars. We will use this money for military modernization, operations, and maintenance.

The National Defense Stockpile is a large inventory of strategic and critical materials set aside for a national emergency. The market value of the 1997 stockpile was \$5.3 billion. We can sell or otherwise dispose of excess inventory after we receive the proper authority from Congress. By law, however, we must try to avoid causing undue market disruption. Our goal is to dispose of \$2.2 billion in excess stockpile inventories by the year 2000.

We are also working to reduce the amount of DoD property held by defense contractors. We often loan contractors government tooling or equip-

ment to perform defense-unique tasks. Since the 1980s, the original value of our property in contractor hands has grown in spite of repeated efforts to curb growth. Our goal is to dispose of \$3 billion worth by the year 2000.

Finally, we are looking to **Reduce Excess Inventories** to match the current needs of our reduced troop levels. From a 1989 high valued at \$107 billion, we are now reducing from \$68 to \$56 billion by 2000.

TAKING ACTION

We are aggressively marketing to sell our inventory of critical and strategic materials. We are working closely with Congress and industry to ensure that we receive a good price for our inventory without unfairly undermining the commercial market.

In the future, to reduce the amount of government property held by contractors, we will rely on commercial suppliers to use their own equipment.

To reduce our excess supply inventory, we are being more selective in what we buy and how we buy it. We are improving equipment reliability, decreasing order and delivery times, and bypassing government warehouses.

Reducing Weapons Cost Growth

OUR THREE-YEAR GOAL

Minimize cost growth in major defense acquisition programs to no greater than one percent annually.

Historically, we have overspent our original budgets for major new weapons. Some of this cost growth was necessary to deal with changes in technology. Schedule slips and inaccurate estimates of the original cost have caused additional cost growth. Our goal is to minimize cost growth during the development and production of major new weapons by achieving greater program stability.

TAKING ACTION

To control the cost growth we are continuing to:

- monitor major weapon programs quarterly for cost growth;
- focus on cost growth when making programming and budgeting decisions; and
- look closely at how much money programs are asking for in the program acquisition process.

We are measuring our progress and studying additional actions to keep cost growth below one percent.

DoD ESTABLISHES DEFENSE CONTRACT MANAGEMENT AGENCY

The Department of Defense announced today the establishment of the Defense Contract Management Agency [DCMA] effective March 27, 2000. Establishing the DCMA assigns responsibility for Department of Defense contract management to the new agency.

DCMA was formerly the Defense Contract Management Command [DCMC], a major subordinate command of the Defense Logistics Agency [DLA].

"Establishing DCMA will allow us to be more responsive to both our military service and defense agency customers," said Maj. Gen. Timothy P. Malishenko, DCMA Director. "We're committed to great service, and I expect that as an agency we will continue to be a catalyst for the success of defense acquisition reform."

DCMA will be under the direction and authority of the Under Secretary of Defense (Acquisition, Technology and

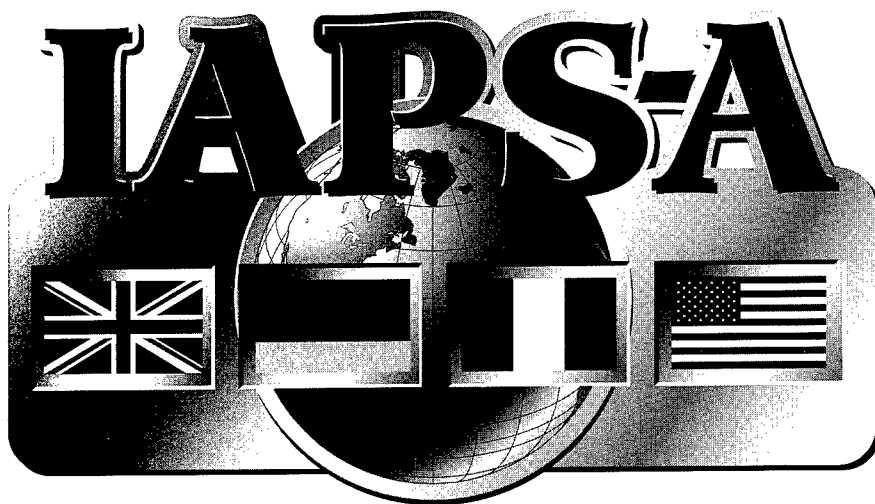
Logistics). The agency will consist of all the employees and resources of the former DCMC, including 12,539 full-time positions for fiscal 2000 that will be transferred from DLA.

DCMA supervises and administers contracts with the thousands of suppliers who deliver goods and services to the military each year. The new agency also is chartered to streamline and standardize the contracting process.

DLA provides supply, technical, and logistics combat support to the military services and to federal civilian agencies.

Editor's Note: This information, released April 3, 2000, by the Office of the Assistant Secretary of Defense for Public Affairs, is in the public domain at <http://www.defenselink.mil/news> on the Internet.

Twelfth Annual International Acquisition/Procurement Seminar — Atlantic (IAPS-A)



June 26–30, 2000

**Sponsored by the
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The Twelfth Annual Acquisition/Procurement Seminar — Atlantic (IAPS-A) focuses on international acquisition practices and cooperative programs. The seminar is sponsored by the International Defense Educational Arrangement (IDEA) between defense acquisition educational institutions in the United Kingdom, Germany, France, and the United States.

Those eligible to attend are Defense Department/Ministry and defense industry employees from the four IDEA nations who are actively engaged in international defense acquisition programs. Other nations may participate by invitation. Nations participating in past seminars were Australia, Belgium, Canada, Denmark, Ireland, Italy, Japan, The Netherlands, Norway, Portugal, Romania, Singapore, and Spain.

This year's seminar will begin June 26 at the Royal Military College of Science (RMCS), Shrivenham, United Kingdom. The last day of the seminar, June 30, will be an optional day for those interested in the educational aspects of international acquisition.

The IAPS-A is by invitation only. Those desiring an invitation, who have not attended past international seminars should submit a Letter of Request on government or business letterhead, to DSMC by fax. Qualified participants pay no seminar fee. Invitations, confirmations, and joining instructions will be issued after May 1.

Invitations to submit a request to DSMC for participation in the seminar should be sent to DSMC by fax to the following address: DSMC, 1200 1st St., Suite 100, Arlington, VA 22204-4302.

- Prof. Don Hood, Director, International Acquisition Courses
- Sharon Boyd, Projects Specialist

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THE DEFENSE SYSTEMS MANAGEMENT COLLEGE
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International Congress and Exhibition On Defense Test, Evaluation and Acquisition

The Global Marketplace

NORENE L. BLANCH

Twenty-first century defense requires a whole new set of paradigms when it comes to realistically dealing with the impact of new technology in the development of major defense weapons systems, the changing face of defense threats, and the new development and implementation of defense policy on test, evaluation, and acquisition.

Senior defense officials from the United States, Canada, and other allied nations came together to participate in the International Congress and Exhibition on Defense Test, Evaluation, and Acquisition: The Global Marketplace, held Feb. 27 — March 2, in Vancouver, British Columbia, Canada. This international event was organized and sponsored by the National Defense Industrial Association (NDIA) under the leadership of Samuel Campagna, Director, Operations, NDIA.

What Have We Learned?

The congress devoted the first day to providing a forum that featured tutorials on topics ranging from how to submit proposals for foreign comparative testing, to comparisons on how the United States, Canada, and other allied nations conduct test and evaluation; from independent test and evaluation of commercial products to the use of modeling and simulation to support test, evaluation, and acquisition.

Blanch is an editor, Visual Arts and Press Department, Division of College Administration and Services, DSMC.



Walter W. "Walt" Hollis, Deputy Under Secretary of the Army for Operations Research (right), is presented the National Defense Industrial Association (NDIA) Gold Medal by retired Army Maj. Gen. Paul L. Greenberg, Vice President, NDIA Operations, at The International Congress and Exhibition on Defense Test, Evaluation, and Acquisition. This year's event was held in Vancouver, British Columbia, Feb. 27 — March 2. Hollis was recognized for his dedicated and longstanding service in the field of Test and Evaluation. As continued recognition of his lifetime contributions, the Test and Evaluation Division of NDIA will present The Walter W. Hollis Award for Lifetime Achievement in Defense Test and Evaluation to a leader in the Defense Test and Evaluation community at each annual Test and Evaluation conference.

Industrial Committee on Operational Test and Evaluation (ICOTE)

An Industrial Committee on Operational Test and Evaluation (ICOTE) met simultaneously. John Stoddart, Vice President, Defense, Oshkosh Truck Corporation, Oshkosh Wis., is chair of the ICOTE. Stoddart explained who is involved and why this committee is so important to test and evaluation.

"I would have to say that the ICOTE is a body of senior executives from the government and industry dedicated to the proposition outlined by Jack Gansler [Under Secretary of Defense for Acquisition, Technology and Logistics], Dave Oliver [Principal Deputy Under Secretary of Defense for Acquisition, Technology and Logistics], and the other principals in streamlining acquisition. Our part of the acquisition process," Stoddart said, "deals with test and evaluation. Predominantly, we are a group made up of ground, air, and sea members of both industry and government. The purpose is to continuously improve the testing process rather than address discrete events."

Stoddart told the conferees that ICOTE's most significant contribution to the test and evaluation community was the standardization of release of acquisition (test) documentation to industry and the government. What this seemingly innocuous action did, Stoddart explained, "was to ensure that everyone was operating off the 'same sheet of music' to use a cliché." ICOTE also very importantly provides a forum for highest-level feedback for contractor concerns, he said, allowing Service component Operational Test Commands to discuss common points with their contractors, as well as their counterparts and their contractors.

"When you have action-oriented executives like Phil Coyle [Director, Operational Test and Evaluation] and Jim O'Bryon [Deputy Director, Operational Test and Evaluation/Live Fire Testing] on the one hand and senior executives from industry on the other, you not only get good ideas, you get problems solved and actions completed." Stoddart also



Retired Air Force Gen. Larry D. Welch, President, Institute for Defense Analyses, chaired a panel on "The Changing Face of Warfare." Said Welch, "I suggest to you that this changing face of warfare is not a young face. It's not an unlined face. It's a complex face. It reflects and has the marks of hard experience. It is tough and unforgiving. And we will indeed have to face it together."

spoke of the harmonization of the testing process, which allows for mid-course corrections and problems solved by an iterative process instead of a huge scramble at the end of a period. This, he said, allows for a better relationship and problem-solving process throughout the continuum, which is the acquisition process.

The Global Perspective

James F. O'Bryon, Deputy Director, Operational Test and Evaluation/Live Fire Testing, Office of the Secretary of Defense and Conference Chair, supported Stoddart's claim as he took the idea of cooperation from the national to the international level. There is no doubt, O'Bryon told the audience, that in order to develop, test, and acquire major weapons systems, the United States and allied governments have to begin to see things from a global perspective. Each government, according to O'Bryon, must: 1) evaluate what goods and services are available to them via the worldwide marketplace; 2) look closely at what they bring to the table; and 3) ask themselves what goods and services they offer that

will be beneficial on the international market.

The economic and defense relationship between Canada and the United States, O'Bryon said, is a good example of cooperation and positive assessment in order to achieve mutual benefit from each other's resources. The conference, he stated, was significant in shedding light on the sometime transparent partnership that exists between the two countries.

Why Canada?

"Why Canada?" was the question posed by O'Bryon in his welcoming address to the Congress. O'Bryon said he recently discovered that the United States conducts more defense-related imports to Canada than any other country. Presenting charts and statistics to support his claim, he proceeded to explain Canada's significance as a trade partner as well as a defense partner to the United States.

According to O'Bryon, statistics reveal that imports from the United States to Canada rose from \$100 million in 1995 to more than \$400 million in 1999. This increase far exceeded imports to any other country. "What we are seeing is an increase in the flow of goods exported from the U.S. into Canada, and in some cases we subsequently dropped some exports to other nations, so Canada is growing in importance to the U.S. as far as trade is concerned." Holding the congress in Vancouver, O'Bryon told the attendees, was indeed fitting as Canada continues to grow in importance in the area of trade.

Strong Budgets, Larger Impact

There remains little doubt and much discussion on how drastic budget reductions have impacted the U.S. Department of Defense in the past 10 years. This realization continues as the Office of the Secretary of Defense (OSD) takes note of how acquisition streamlining has impacted the acquisition community, and how acquisition reform has impacted test and evaluation.

This impact, O'Bryon said, not only affects test and evaluation, but it sends a rippling effect that also impacts the U.S. industrial base. The United States is not unique when it comes to implementing acquisition reform measures, but the need for undergoing acquisition reform is a key concern among allied nations as well, he concluded.

Canada Focuses on "Getting it Right"

Alan Williams, Assistant Deputy Minister, National Defence Headquarters, Canada's equivalent to Dr. Jacques S. Gansler, represented the conference voice "from our neighbors to the north." He spoke to the congress about Canada's acquisition reform efforts called "Getting it Right," describing them as Canada's means of "acquiring the right goods or services, at the right time, for the right price, to the right place, with the right support, applying the right rules, and with the right people."

Commenting on the importance of Canada's leveraging of industries' and allied nations' knowledge and experience in the area of test and evaluation, Williams also spoke of Canada's long history of commitment and participation in multinational operations.

"Today we are involved in more than 20 operations throughout the world. During 1999 we had more military deployed in more operations than the Korean War. In every case, Canada acted as part of a multinational operation. We fought and operated with and beside troops from around the world." Williams related that Canada has had a long history of defense alliances going back to World War II. Canada ranks as one of the founding members of the North Atlantic Treaty Organization (NATO), and he described Canada as having been a "channel of communication between key NATO countries" during the Cold War.

Williams emphasized Canada's continued commitment to the maintenance and enhancement of international defense relationships. This commitment is evident in the fact that Canada holds Memoranda of Agreement (MOA) with

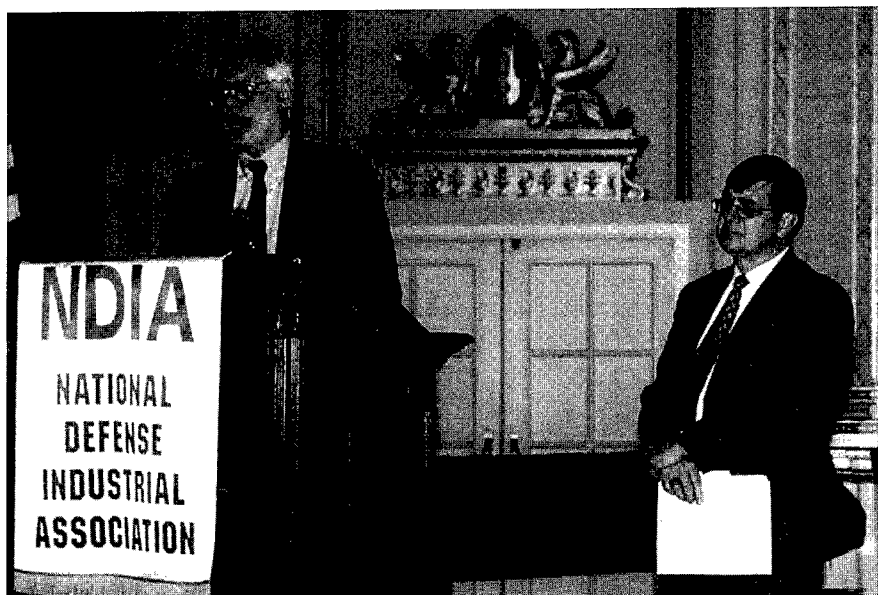
"It's astonishing to me that the Services have no money for research in better ways to do testing; they should have. To give our people every opportunity to succeed, we need to invest in their ideas. I've begun the process to obtain new applied research funds to allow this to take place."

—Philip E. Coyle
Director, Operational Test & Evaluation

17 countries other than the United States. "With the U.S., we have over 1,000 [MOA] — some going back nearly a half century.

"Throughout the years," Williams said, "the U.S. and Canadian defence industrial bases became so integrated that Congress defined the United States technology and industrial base as 'the research and development, production, and maintenance capabilities of the United States and Canada.' So under U.S. law, the Canadian firms in our special defence economic partnership are considered part of the U.S. defence industrial base."

He also discussed the partnership between the United States and Canada in the North American Technology and Industrial Base Organization (NATIBO). This organization, he explained, promotes cooperation between the two countries and "promotes a cost-effective, healthy technology and industrial base that is responsive to the national and economic security needs of the United States and Canada." [More information on NATIBO is available on the Web at <http://www.dtic.mil/natibo/purpose.html>.]



OSD's Director of Operational Test and Evaluation Philip E. Coyle (left) delivers the DoD keynote address, "New Paradigms for Organizing and Managing Defense Test, Evaluation and Acquisition." Introducing Coyle is James F. O'Bryon, Deputy Director, Operational Test and Evaluation/Live Fire Testing.

Another partnership between Canada and the United States is the Canada/United States Test and Evaluation Program (CANUSTEP), according to Williams. "The idea behind CANUSTEP is very simple. Canada and the U.S. agree to make their test and evaluation capabilities and facilities available to the other on an incremental basis."

Canada has historically been, and presently continues to be, actively involved in international collaborative efforts, according to Williams. "Canada's international defence partnerships have been vital to our ability to operate in today's multinational environment. Through our special relationships with the U.S. — which have promoted a very high level of standardization and interoperability — Canada was able, in the recent operations in Kosovo, to be fully and immediately integrated into NATO's bombing operations, contributing their fair share."

Williams assured the attendees that "Defence alliances are more vital then ever to Canada and to its security partners." These alliances include both industry and other countries, he added. Concluding, Williams said, "The success of these alliances and our continuing technological advances will ensure our security as we proceed into the new millennium."

New Opportunities — New Paradigms

The test and evaluation community in the United States has no problem understanding Canada's need to streamline acquisition, according to Philip E. Coyle, Director, Operational Test and Evaluation, OSD. Coyle noted that although DoD's acquisition reform efforts have been successful, this success has come at a heavy price. Because of this price, it is time to explore new opportunities and embrace new paradigms in Test and Evaluation, he stated.

Repeating an old joke that nonetheless expresses a sobering truth, Coyle said, "Part of the reason we need new paradigms is because our test ranges don't have a 'pair of dimes' to rub together any-

more." DoD needs a new way of thinking," said Coyle, "about how test and evaluation is conducted."

In his Annual Report to the Secretary of Defense and the Congress, he said we need a new approach "to get away from constantly studying T&E resources with the aim of reducing them — T&E has already been reduced beyond the optimum level to support acquisition."

Coyle described his first paradigm regarding T&E. "My paradigm is that we are going to build for the future. Building for the future in T&E is sufficiently unprecedented that it ought to attract an enduring group of adherents — getting new investment in T&E is sufficiently unprecedented that you should like the idea."

Coyle's second paradigm focuses on building and investment. "Building for the future is sufficiently open-ended and presents many problems for us to solve. Getting new investment for T&E is sufficiently open-ended that there is lots of work for us all to do."

But, the willingness to embrace new paradigms leads to new opportunities. "I can think of scores of new opportunities in test and evaluation," Coyle said as he proceeded to outline 10 new opportunities in store for T&E.

Test and Evaluation in OSD has been reorganized giving DOT&E the responsibility for stewardship of the nation's test ranges along with the traditional roles in operational and live fire testing. "Stewardship, real stewardship, of the test ranges," said Coyle, "means not just hanging on to the facilities we have, but building for a future with new technologies involved in testing, and supporting the new technologies in the systems under test. It means that we will stop planning cuts and start planning investments."

The Board of Directors [BoD], which has been made up of the Service Vice Chiefs

of Staff and now OSD, are working together in ways they never have before. The Board of Directors has included DOT&E as a full member and partner, and all have agreed together that they are not interested in cutting T&E any more.

To build for the future, the BoD has committed to a series of strategic planning workshops. "We will try to lay out a vision and a strategy for strengthening and rebuilding our test centers for a new future."

OSD and the Services are developing a new approach to acquisition that builds in the flexibility to take new ideas from the laboratories to the test ranges more spontaneously and more rapidly. "A new DoD 5000 is being written to guide this approach," Coyle said, "and it surely will present many new opportunities for DoD test centers and for industry. It also will invite new partnerships between DoD test centers and industry for developmental testing, as well as reinforce the need for an early operational focus in all testing regardless of where it is done."

DOT&E is trying to bring an early operational focus to developmental and operational testing, with early involvement by the Service Operational Test Agencies, and closer partnerships with the Major Range and Test Facility Bases. This, according to Coyle, will provide operational insight and feedback early in the acquisition cycle while change is still relatively painless. These changes will benefit the test ranges, he explained, because they will bring an earlier focus to the spectrum of tests that must be done and the facilities needed for those tests. These changes will also benefit contractors and the national defense by identifying and solving problems early, the type of problems that have delayed new military equipment to the warfighter too often in the past.

"There is tremendous opportunity, not to mention challenge, in interoperability," Coyle stated. Under Secretary

Gansler and [former] Vice Chairman [Gen. Joe] Ralston have issued a new policy, said Coyle, requiring interoperability to be a Key Performance Parameter (KPP) for all new acquisition systems. As Dr. Gansler noted in a recent memorandum, "Recent events, including results from a number of Warfighter Operational Evaluations, have reemphasized the need for improved interoperability, both for U.S. forces and with those of our coalition partners ... this will require new efforts in all steps of the acquisition process, for all systems, and at all ACAT [Acquisition Category] levels."

Interoperability testing will involve global systems and international partnerships, not just interoperability Service-to-Service, Coyle noted. DOT&E, he emphasized, especially needs ideas from industry for new investments that could improve interoperability testing and interoperability with coalition forces.

"What we're seeing is a new mission focus in testing and training," said Coyle. "Mission includes interoperability. Mission includes coalition partners. Mission includes tactics, techniques, and procedures that are validated in testing and training. Training is moving beyond the operator to a mission focus, and testing is moving beyond the single system to integrated systems of systems."

DoD — Branching Out

There is opportunity in the fact that people in OSD, in the Services, and in Congress realize that testing has been cut too much and are trying to reverse the trend, according to Coyle. But it won't be easy, he warned. Coyle went on to say that all the Services have many demands on their budgets. The Army is trying to build a new lighter-weight force. That will be expensive, he commented, especially with the investment in battlefield digitization the Army has already begun. The Navy is trying to develop new theater missile-defense systems and the tech-

"Tell someone - someone who you think can make a difference - about the special problems you face at your range or test center, in your business or industry. That includes people in the Military Departments, and at the test centers, as well as me. No one is conveying these messages well, and as a result very few people actually know what kinds of problems you have."

—Philip E. Coyle
Director, Operational Test & Evaluation

nologies for managing a complex battlespace so that it is truly a single integrated picture. The Air Force is trying to take precision engagement to new levels and requires funding for many new high-technology aerospace programs that are not being funded under the weight of important but large aircraft programs. "All these pressures, and many more I've not mentioned," Coyle said, "will keep test and evaluation under pressure."

No. 7 — Cutting T&E Doesn't Always Save Money

Coyle said that people in both government and industry are beginning to realize that when T&E doesn't have the capacity to support acquisition programs — or acquisition programs have to wait in line — it costs much more than was saved by cutting T&E. In his Annual Report this year, Coyle cited specific examples of acquisition programs that had to wait for T&E. A month's delay in a large acquisition program, he commented, is serious money.

The Defense Science Board Task Force on T&E said it well: "The focus of T&E

should be on optimizing support to the acquisition process, not on minimizing (or even optimizing) T&E capacity." This means, Coyle explained, that people are beginning to think differently about T&E capacity. Where a few years ago the preoccupation was on "excess" capacity, now people realize that DoD needs readiness capacity in T&E, just as DoD needs readiness for the warfighter.

"If T&E isn't ready, new equipment takes longer and costs more to reach the warfighter, which affects warfighter readiness just as surely as inadequate operating support or inadequate training can hurt readiness," Coyle said. "We need readiness capacity in T&E, just as we need readiness capacity in our daily lives." To illustrate, he used an analogy with which those living in and around the nation's capital could readily identify. "We don't close the outer loop of the beltway in order to

eliminate the excess [traffic] that exists during most of the day. We try to optimize the value added by our roadways to the sum of daily life." Coyle said that DoD needs to build for the future by optimizing the contributions and value added of T&E to the sum total of the acquisition process.

No. 8 — Increased Funding

Funding for acquisition and weapons modernization is going up, Coyle noted. In the President's new budget, weapons modernization is up 50 percent in fiscal year 2001 from its low in fiscal year 1997. "This means new programs," he said, "and new programs mean more work for testing. And the workload in T&E has been very robust throughout the decade of the nineties.

"In operational testing it has gone up. At AFOTEC [Air Force Operational Test and Evaluation Center], their workload has tripled; at ATEC [Army Test and Evaluation Command], their workload has doubled; and at OPTEVFOR [Operational Test and Evaluation Forces (Navy)], it is the highest at any time in

their history. In developmental testing, the workload has gone up in some areas and is down or steady in others." Overall, Coyle emphasized, the developmental test workload is steady and very robust. And overall it has not gone down as people thought it would earlier in the decade.

Industry is under many of the same pressures to consolidate their T&E capabilities as at DoD test ranges, said Coyle. With each new merger, large defense contractors have found that they must work to reduce their test infrastructure. But can they count on the DoD?

"To rely on DoD test ranges," said Coyle, "industry needs to be sure of three things: First, they need to know that we will be there when they need us, that we will honor their schedules. Second, they need to know what testing will cost and be able to depend on that price. And third, they need to know that we can keep a secret, that they can test proprietary ideas and keep them proprietary."

Coyle went on to say that the same is true for global partners. If other nations bring work to DoD test ranges or DoD takes work to theirs, protocols are needed that protect the interests of both parties, including the environment, cost sharing, and scheduling. An example Coyle cited was the recently renewed partnership the United States has with Canada at the Nanoose Range, not far from Vancouver. The United States benefits from the natural properties of a unique underwater test area and a 35-year partnership of good will and cooperation.

Coyle stated his belief that there is opportunity for the people at DoD's test centers — people who have new ideas and new concepts. "I believe we need funding for research in T&E. Some of your new ideas need to be tried out before you can sell them to a program manager. This takes test technology funding. It's astonishing to me that the Services have no



Thomas E. Peoples, Senior Vice President, International and Washington Operations, GenCorp, delivers the Industry keynote address, "Strategic Vision for the Future of Defense and Allied Cooperation."

money for research in better ways to do testing; they should have. To give our people every opportunity to succeed, we need to invest in their ideas. I've begun the process to obtain new applied research funds to allow this to take place."

Making a Difference

Coyle spoke of the single most important step testers and evaluators can take to maximize their T&E opportunities. "First, every day tell someone — someone who you think can make a difference — about the special problems you face at your range or test center, in your business or industry. That includes people in the Military Departments, and at the test centers, as well as me. No one is conveying these messages well, and as a result very few people actually know what kinds of problems you have. I try to do this every day; often several times a day.

Coyle told the audience they'd be amazed at how few people in Congress or OSD or the Military Departments have the faintest idea about the cuts T&E has endured. "They think you haven't suffered as much as the rest of the Army, or the Navy, or the Air Force. Or that your industry hasn't suffered as much as others. People are surprised when I explain the severity of the cuts; at first they don't believe me because they haven't heard of the impacts before."

1999 TESTERS OF THE YEAR

A highlight of the conference was the awards banquet where the following individuals were recognized as Outstanding Testers of the Year.

Civilian

Eric L. Kech, Technical Advisor,
JADS/JTF

Military

Army Col. Terry Mitchell,
OSD/DOT&E

Contractor

Dale Leischer, Sikorsky

Civilian

Colleen Devlin, USAEC

Military

Army Maj. Layne B. Merritt, USADTC

Contractor

Robert Hadden, Maden Tech
Consulting, Inc.

Civilian

James A. O'Neill, NAVSEA

Military

Navy Cmdr. Jeffrey R. Penfield,
OT&EF

Contractor

Chris Baniewicz, Lockheed Martin

Civilian

Gary L. Black, Tyndall AFB

Military

Air Force Capt. Charles D. Ormsby,
Holloman, AFB

Contractor

Emmett A. Redding,
MacAulay Brown Inc.

Part of the problem, Coyle believes, is the military tradition that you don't whine. "If we don't tell people," Coyle said, "they won't know." He also said that the T&E community would not have had to suffer all the cuts of the past decade if it had been able to articulate the damage that was being done — to readiness, to test capability, and to acquisition programs themselves. "I try to do this every day, and I'm asking you to do this also," Coyle challenged. "Find someone who you think can make a difference and tell them!"

Changing Face of Warfare — Working Together

Many panel discussions took place during the conference, covering issues of major impact to the future of program management test and evaluation.

- International Test, Evaluation, and Acquisition Issues
- Sharing Test Ranges
- Facilities and Capabilities Across Borders
- Canadian Defence Test, Evaluation, and Acquisition
- Interoperability
- Test and Evaluation of Multinationally Produced Hardware
- Nuclear Weapons Safety
- Modeling and Simulation
- International Testing and Cooperative Use of Facilities
- Integrated Testing and Training
- Changes in Warfare Methods
- Survivability
- Impact of Environmental Regulations on Defense Test, Evaluation, and Training
- International Synthesis Panel

Each issue addressed by the various panels communicated the changes that have occurred in the way the United States and its allied nations conduct warfare. The panel discussion on the Changing Faces of Warfare, however, cut to the heart of this issue.

Led by retired Air Force Gen. Larry D. Welch, president of the Institute for Defense Analyses and former U.S. Air Force Chief of Staff, other panel members included: Dr. James A. Boutillier, Special Advisor for Policy, Maritime Forces, Pacific Headquarters, Victoria, British Co-



Alan Williams, Assistant Deputy Minister, National Defence Headquarters, Canada, speaks on "Canadian Defence Acquisition and Support - Getting It Right for the New Millennium."

lumbia; David Chu, Vice President for Army Research, RAND Corporation, Director, Arroyo Center, and former Assistant Secretary of Defense for Program Analysis and Evaluation; and retired Navy Rear Adm. John Zerr, Vice President, The Boeing Company and former Commander, Operational Test and Evaluation Force.

Introducing the panel, Welch stated, "The future face of war is not very clear, even the current face of war is not clear." He talked about how the threat of cataclysmic warfare faded as the Cold War went into the dustbin of history. Still, DoD found that, in fact, there was a dramatic increase in the demand for multinational armed forces to deal with various levels of contingencies, ranging all the way from humanitarian actions in response to natural disasters, to major conflict.

Welch noted the dramatic increase in lethal confrontations around the world, commenting that "Longstanding animosities, some of them centuries old, frozen to inaction for 50 years by the Cold War, thawed into a very dangerous soup of new and more effective ways to kill people."

Welch also talked about the nation's new role as peacekeepers and the practice of designing forces for major war and then just doing the best we can with those forces when they're called on to do things other than major war. This, he noted, was an acceptable practice during the Cold War, but that is no longer the case. "The standard of performance, across the entire range of warfare or the entire range of contingencies, from humanitarian to major war, has become near-perfection. People expect no lost battles, near-zero combat casualties, and even near-zero collateral damage against adversaries." Some of these characteristics sound like impossible standards, he admitted, but the good news, according to Welch, is that "There is some reason to believe that something like that might be possible." He went on to name three of the changes in the nature of warfare and the capabilities that have brought about permanent change.

Battlespace Awareness

One change, is battlespace awareness as a basis for decision superiority — to get the right force, at the right place, at the right time.

Precision Navigation

The second one is precision navigation. Knowing where you are, Welch said, is a prelude to knowing where it is that you're going. Precision navigation also provides a much higher degree of assurance that the warfighter gets to the right place at the right time. And finally, precision navigation, Welch stated, is indeed an important difference in the way DoD conducts warfare today.

Precision Munitions

Precision munitions allow warfighters to destroy targets, and only the targets that they intend to destroy, and to do so with minimum force.

Concluding, Welch described the changing face of warfare. "So I suggest to you that this changing face of warfare is not a young face. It's not an unlined face. It's a complex face. It reflects and has the marks of hard experience. It is tough and unforgiving. And we will indeed have to face it together.

TITANIC: TEST, EVALUATION AND ACQUISITION OF THE TITANIC

apping off the Annual Awards Banquet for the International Congress on Defense Test, Evaluation and Acquisition was a fascinating presentation by Roy Brander of Canada. Brander revealed his research and insights, complete with charts and photos, into the lessons to be learned from the Test, Evaluation and Acquisition of the *Titanic*.

The *Titanic*, a steamship in England's White Star Line, set out on its doomed maiden voyage, with 2,227 enthusiastic passengers and crew members on board for the history-making trip from Southampton, England, to New York City. Only 705 would survive the ship's collision with a massive iceberg.

Titanic was one of the largest movable objects ever built, measuring in at 883 feet long (1/6 of a mile), 92 feet wide, 46,328 tons, and 104 feet high, from keel to bridge.

The ship was designed to hold 32 lifeboats, though only 20 were on board; White Star management was concerned that too many boats would sully the aesthetic beauty of the ship. Survivors were rescued by the *Carpathia*, which was 58 miles southeast of *Titanic* when it received the distress call.



Titanic boasted electric elevators, a swimming pool, a squash court, a Turkish Bath, and a gymnasium with a mechanical horse and mechanical camel.

The wreckage of *Titanic* was recovered in 1985, 12,500 feet down, about 350 miles (531 km) southeast of Newfoundland, Canada.

International Students Add Cultural Awareness, Diversity to APMC 00-2



Anderson (above right) welcomes Navy Capt. Peter Liao from Taiwan, to the APMC 00-2 reception May 8.

Photos by Richard Mattox

Air Force Brig. Gen. Frank Anderson, DSMC Commandant (below, second from left) and Tony Kausal, DSMC Air Force Chair (far right) welcome Dr. Eui Dong Park (far left) and Lt. Col. Tae-ho Hwang from the Korean Ministry of National Defense at a reception for Class 00-2, Advanced Program Management Course (APMC) May 8. Both students are attending APMC as part of the College's efforts to promote greater working relationships with our allies on Cooperative Acquisition Programs.



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- Assessment
- Evaluation
- Professional Development
- Technical subject matter in all defense acquisition subject areas such as contracting, engineering, logistics, production, and quality management.



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AR news and events; reference library; DUSD(AR) organizational breakout; acquisition education and training policy and guidance.

<http://www.acq.osd.mil/sa/asm>

Documentation, including Department of Defense Directives 5000.1 and 5000.2-R, Major Defense Acquisition Programs List, and more.

<http://www.dodig.osd.mil/pubs/index.html>

Search for audit and evaluation reports, Inspector General testimony, and planned and ongoing audit projects of interest to the acquisition community.

<http://www.acq.osd.mil/io/se/index.htm>

Systems engineering mission; Defense Acquisition Workforce Improvement Act information, training, and related sites; information on key areas of systems engineering responsibility.

<http://www.deskbook.osd.mil>

Automated acquisition reference tool covering mandatory and discretionary practices.

<http://www.acq.osd.mil/dau/arcc>

Acquisition Reform training opportunities and materials; announcements of upcoming Acquisition Reform events; an Issues Forum for discussion.

<https://dau.fedworld.gov>

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<http://dacm.sarda.army.mil>

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<http://www.acqnet.sarda.army.mil>

A-MART; documents library; training and business opportunities; past performance; paperless contracting; labor rates.

opportunities; past performance; paperless contracting; labor rates.

<http://www.acq-ref.navy.mil/>

Acquisition policy and guidance; World-Class Practices; Acquisition Center of Excellence; training opportunities.

<http://nadic.nrl.navy.mil>

News and announcements; acronyms; publications and regulations; technical reports; "How to Do Business with the Navy"; much more!

<http://www.navsea.navy.mil/sea017/toc.htm>

Total Ownership Cost (TOC); documentation and policy; Reduction Plan; Implementation Timeline; TOC reporting templates; Frequently Asked Questions (FAQ).

<http://www.abm.rda.hq.navy.mil>

Policy documents; training opportunities; guides on areas such as risk management, acquisition environmental issues, past performance, and more; news and assistance for the Standardized Procurement System (SPS) community; notices of upcoming events.

<https://e-commerce.spawar.navy.mil>

Your source for SPAWAR business opportunities, acquisition news, solicitations, and small business information.

<http://www.safaq.hq.af.mil/>

Policy; career development and training opportunities; reducing TOC; library; links.

<http://farsite.hill.af.mil/>

FAR search tool; *Commerce Business Daily* Announcements (CBDNet); *Federal Register*; Electronic Forms Library.

<http://www.dsmc.dsm.mil>

DSMC educational products and services; course schedules; *Program Manager* magazine and *Acquisition Review Quarterly* journal; job opportunities.

<http://www.darpa.mil>

News releases; current solicitations; "Doing Business with DARPA."

<http://www.disa.mil>

Structure and mission of DISA; Defense Information System Network; Defense Message System; Global Command and Control System; much more!

<http://www.nima.mil>

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<http://www.acq.osd.mil/ec/>

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Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

http://atn.afit.af.mil/schedule_page.htm

Schedule of distance learning opportunities.

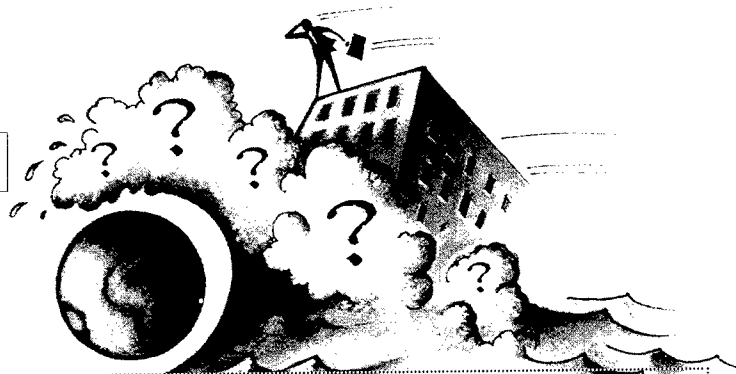
<http://www.gidep.corona.navy.mil>

Federally funded co-op of government and industry participants that provides an electronic forum to exchange technical information essential during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.

ACQUISITION REFORM

An Internet Listing Tailored to the Professional Acquisition Workforce

Surfing the Net



FEDERAL CIVILIAN AGENCIES

<http://www.arnet.gov/>

Virtual library; federal acquisition and procurement opportunities; best practices; electronic forums; business opportunities; acquisition training; Excluded Parties List.

<http://www.faionline.com>

Virtual campus for learning opportunities as well as information access and performance support.

<http://nais.nasa.gov/fedproc/home.html>

Procurement and acquisition servers by contracting activity; CBDNet; Reference Library.

<http://www.asu.faa.gov>

Online policy and guidance for all aspects of the acquisition process.

<http://www.gao.gov>

Access to GAO reports, policy and guidance, and FAQs.

<http://www.gsa.gov>

Online shopping for commercial items to support government interests.

<http://www.loc.gov>

Research services; Congress at Work; Copyright Office; FAQs.

<http://www.npr.gov/>

NPR accomplishments and initiatives; "how to" tools; library.

<http://chaos.fedworld.gov/onow/>

Online service for purchasing technical reports, computer products, videotapes, audiocassettes, and more!

<http://www.SBAonline.SBA.gov>

Communications network for small businesses.

<http://www.uscg.mil>

News and current events; services; points of contact; FAQs.

TOPICAL LISTINGS

<http://www.MANPRINT.army.mil>

Points of contact for program managers; relevant regulations; policy letters from the Army Acquisition Executive; as well as briefings on the MANPRINT program.

<http://www.crfpst.wpafb.af.mil/>

Federal Register and Waivers Package; documents and briefings; reference material; operating procedures; FAQs.

<http://www.dsp.dla.mil>

All about DoD standardization; key Points of Contact; FAQs; Military Specifications and Standards Reform; newsletters; training; nongovernment standards; links to related sites.

<http://www.jads.abq.com>

JADS is a one-stop shop for complete information on distributed simulation and its applicability to test and evaluation and acquisition.

http://www.acq.osd.mil/sa/se/risk_management/index.htm

Risk policies and procedures; risk tools and products; events and ongoing efforts; related papers, speeches, publications, and Web sites.

<http://www.acq.osd.mil/pm>

Implementation of Earned Value Management; latest policy changes; standards; international developments; active notebook.

<http://www.fedworld.gov>

Comprehensive central access point for searching, locating, ordering, and acquiring government and business information.

<http://pub.fss.gsa.gov>

The No. 1 resource for the latest services and products industry has to offer.

INDUSTRY AND PROFESSIONAL ORGANIZATIONS

<http://www.govcon.com/>

Access to current and back issues with search capabilities; business opportunities; interactive yellow pages.

<http://www.dsmcaa.org>

Acquisition tools and resources; government and related links; career opportunities; member forums.

<http://www.eia.org>

Government Relations Department; includes links to issue councils; market research assistance.

<http://www.ncmahq.org>

"What's New in Contracting?"; educational products catalog; career center.

<http://www.ndia.org>

Association news; events; government policy; *National Defense Magazine*.

<http://www.sole.org/>

Online desk references that link to logistics problem-solving advice; Certified Professional Logistician certification.

<http://catt.bus.okstate.edu>

Collaborative effort between government, industry, and academia. Learn about CATT and how to participate.

<http://www.spmn.com>

Site supports project managers, software practitioners, and government contractors. Contains publications on highly effective software development best practices.

<http://www.crows.org>

Association news; conventions, conferences and courses; *Journal of Electronic Defense* magazine.

If you would like to add your acquisition or acquisition reform-related Web site to this list, please call the Acquisition Reform Communications Center (ARCC) at 1-888-747-ARCC. DAU encourages the reciprocal linking of its Home Page to other interested agencies. Contact the DAU Webmaster at dau_webmaster@acq.osd.mil

KEITH CHARLES

*Director, Acquisition, Technology,
and Logistics Workforce Management*

“Your Acquisition Future – Help DoD Invest in Human Capital”

Are you one of the members of the acquisition workforce eligible to retire by 2005?

You will be affected even if you are not. Half of the 152,000 current civilian acquisition workforce will be eligible for retirement in 2005. That's just five years away. The aging of the baby boomer generation and changes brought on by the post-Cold War DoD environment have made human capital an issue acquisition workforce leadership must address quickly. We need help from all

sectors of the acquisition workforce to pursue ideas on attracting and retaining good people in an increasingly competitive job environment. We need *your help now*.



businesslike and results-oriented government, the workforce must have the right people, processes, and technology. According to Walker, people are the most crucial of the three. He said that there is no underestimating the importance of consistent, committed, and persistent leadership in bringing the human capital issue to the forefront of federal management concerns. Walker also made the point that people are assets whose value can be enhanced through investment. As the value

of people increases, so does the performance capacity of the organization, and therefore its value to clients and other stakeholders.

Why We Need Your Help

According to Senate testimony by David M. Walker, Comptroller General of the United States, federal agencies require a knowledge-based, multifunctional workforce sophisticated in new technologies, adaptable, and open to continuous learning. He stated that the federal government must have the tools and flexibilities to attract, hire, and retain top-flight talent. In reducing the number of their employees, agencies reduced the influx of new people resulting in a loss in the new competencies needed to sustain excellence.

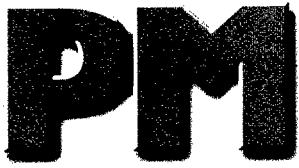
This is not a DoD-unique problem. The entire federal government has this problem. For performance management principles to succeed in producing a more

DoD Acquisition Corps — What We're Doing

A Future Workforce Task Force has been established to put tools in place that will address the recruiting, training, and retention issues that will surface with the upcoming 2005 retirements. The Task Force has 30 days to pursue ideas from every possible source and begin its planning. It intends to borrow ideas from the private sector, other government agencies, and *you* — the acquisition workforce.

Help Us Help You

Send your ideas on workforce recruitment and retention to (703) 578-2788 or E-mail **your-future@acq.osd.mil**. For more information, please visit our Web site at **www.acq.osd.mil/yourfuture**.



A Bimonthly Magazine
of the Defense Systems
Management College

A starburst graphic consisting of numerous thin, black lines radiating outwards from a central point, creating a sunburst or star-like effect.

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